Alberta Energy Regulator

Directive 059: Well Drilling and Completion Data Filing Requirements

December 19, 2012

Effective June 17, 2013, the Energy Resources Conservation Board (ERCB) has been succeeded by the Alberta Energy Regulator (AER).

As part of this succession, the title pages of all existing ERCB directives now carry the new AER logo. However, no other changes have been made to the directives, and they continue to have references to the ERCB. As new editions of the directives are issued, these references will be changed.

Some phone numbers in the directives may no longer be valid. Contact AER Inquiries at 1-855-297-8311 or inquiries@aer.ca.

ERCB Energy Resources Conservation Board

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Directive 059

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Well Drilling and Completion Data Filing Requirements

The Energy Resources Conservation Board (ERCB/Board) has approved this directive on November 26, 2012.

<original signed by>

Dan McFadyen
Chair

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1 Overview of the Directive

The ERCB collects well drilling, completion, reconditioning (i.e., servicing), and abandonment data in order to maintain an accurate record of each well drilled in the province, both for its own use and for the use of the oil and gas industry in performing drilling, completion, and servicing operations in a safe and efficient manner.[1]

This edition of *Directive 059: Well Drilling and Completion Data Filing Requirements* describes the Energy Resources Conservation Board's (ERCB's) requirements for the recording and submitting of well drilling, completion, reconditioning (i.e., servicing), and abandonment data. It has been developed to assist industry in completing and submitting daily operations records and well data in a timely manner. See the *Directive 059* webpage on the ERCB website, www.ercb.ca, for frequently asked questions (FAQs), updates, and ongoing *Directive 059* initiatives. For questions on items not covered in this directive or the ERCB website, call the *Directive 059* Helpline at 403-297-8952 (Option 2) or send an e-mail to Directive059Help@ercb.ca or fax to 403-297-7303.

1.1 What's New in this Edition

Key changes within the revised *Directive 059* include the following:

- Clarification and expansion on compliance assurance (see Section 1.2).
- Clarification of the definition of a well when drilled and abandoned at a depth of 150 m or less (see Table 1).
- Replacement of the term "kickoff point (KOP)" with "directional drill event (DDE)" to avoid stakeholder confusion of the term kickoff point. Note that for data submissions, the Digital Data Submission (DDS) system still has the term "kickoff." (See requirement 11 in Section 3.2).
- New requirements for
  - electronically reporting fracture fluid data, including service provider, fracture scenario, carrier fluid type, proppant type, and additives for wells that have been fractured (see Section 4);
  - electronically reporting water source data, including source location, source type, diversion permit information, and volume for all water used in hydraulic fracturing operations with water quality information required for groundwater sources (see Section 4); and
  - reporting fracture fluid and water source data in daily reports of operations (see Appendix 3).
- Addition of protocols to provide limited protection of proprietary information associated with hydraulic fracturing fluids.

[1] Under Section 12.010 of the *Oil and Gas Conservation Regulations* (*OGCR*), a licensee is required to keep and file records and reports of daily operations on wells that are in the process of being drilled, completed, reconditioned, or abandoned in accordance with this directive. A licensee is also required under Section 6.030 of the *OGCR* to submit directional survey data, where applicable, to the ERCB.

1.2 Compliance Assurance

ERCB requirements are those rules that a licensee must follow. The term "must" indicates a requirement for which compliance is required and is subject to ERCB enforcement. The terms "should" and "expects" indicate recommended practices and are not subject to enforcement action.

Each ERCB requirement in this directive has been risk assessed. Noncompliance with any requirement may result in the licensee receiving a response in accordance with the latest edition of *Directive 019: Compliance Assurance*. A list of noncompliance events is available on the ERCB website, www.ercb.ca.

The Noncompliance Escalation Timelines table, accessible through the *Directive 059 webpage* on the ERCB website, outlines the timelines the Well Data Services team will follow in administering enforcement actions.

The ERCB encourages all licensees to be proactive by monitoring their compliance with ERCB requirements. If a licensee identifies a noncompliance, the licensee should inform the ERCB of the noncompliance for consideration under the ERCB voluntary self-disclosure policy set out in *Directive 019*.

In assessing a licensee's compliance with this directive, the ERCB may at any time request a licensee to produce the documents, records, or reports required by this directive. These must be provided by the licensee.

For further details on compliance assurance, including *Directive 019*, see the ERCB website.

2 General Reporting Requirements

2.1 Record of Daily Operations

During the drilling (including presetting surface casing), completion, reconditioning, or abandonment of a well, a licensee must keep a record of daily operations. Licensees must keep this record on site at the well or at its field office. The record of daily operations must contain complete data on all operations carried out on the well, including

- drilling (including presetting surface casing),
- fishing,
- shooting,
- perforating,
- acidizing,
- fracturing,
- surveying,
- testing,
- casing repair,
- vent flow repair,
- downhole and/or surface abandonment,

- re-entry or resumption of drilling, and
- re-abandonment.

Any suspension of operations must also be noted in the report. See Section 2.5 and Appendix 3 for the minimum submission requirements for the daily record of operations.

2.2 Submitting Electronic Drilling Data

Licensees must submit summary electronic drilling data to the ERCB within 30 calendar days from the conclusion of an operation. If drilling data have not been submitted within 60 days of notification[2] of new drilling activity, the ERCB will respond in accordance with *Directive 019*.

If drilling to licensed total depth commences less than 30 calendar days from presetting surface casing, it is considered as one operation for the purpose of this directive and licensees are not required to submit electronic drilling data separately for the preset operation.

2.3 Submitting Electronic Completion or Abandonment Data

Licensees must submit summary electronic completion or abandonment data to the ERCB within 30 calendar days from the conclusion of a completion or abandonment operation or prior to a well status change required for a volumetric submission to PETRINEX (previously named the Petroleum Registry of Alberta).

2.4 Submitting Electronic Fracture Fluid and Fracturing Water Source Data

Licensees must submit summary electronic fracture fluid composition and fracture fluid water source data to the ERCB within 30 calendar days from the conclusion of an operation. Note that fracture interval data must be submitted before fracture fluid composition and fracture fluid water source data can be submitted.

2.5 Submitting Hard-copy (Tour) Reports of Daily Operations for Preset Surface Casing, Drilling, Completion, and Abandonment

Licensees must submit hard-copy reports of daily operations to the ERCB's Core Research Centre no more than 7 calendar days after the acceptance of electronic summary data for drilling, completion (including fracture fluid composition and fracture fluid water source data), and abandonment operations. Only submit reports related to operations listed in Appendix 3. Do not attach reports that have their own submission process (i.e., directional surveys, logs). If drilling to licensed total depth commences less than 30 days from the presetting of surface casing, it is considered as one operation for the purpose of this directive and it is not necessary to submit a separate hard-copy report of the preset operation. Licensees must also attach a print out of the cover sheet provided when an electronic submission has been accepted. This cover sheet contains the unique well and submission identification information of the electronic submission.

The ERCB will not accept hard-copy reports of daily operations that contain personal information[3] other than the name and contact information of the person submitting the report. Licensees must remove all other personal information and confirm that the

[2] Licensees must submit notifications of any new drilling activity in accordance with the *OGCR*. These notifications assist the ERCB in estimating when to expect the data to be submitted.

[3] Personal information is any recorded information about an identifiable individual.

report does not contain personal information other than what is required by the ERCB on the printed cover sheet of the report. The ERCB may issue a response against any licensee failing to remove personal information from a paper report of daily operations.

For further information on a licensee's obligations on personal information on paper reports of daily operations, see *Bulletin 2010-43: Removal of Personal Information Contained in Well Drilling and Completions Daily Operations Reports (Tour Reports)*.

Paper reports of daily operations must be legible and submitted to

Energy Resources Conservation Board
Core Research Centre
3545 Research Way NW
Calgary, Alberta T2L 1Y7

2.6 Submitting Directional Survey Reports

In accordance with Section 6.030 of the *Oil and Gas Conservation Regulations* (*OGCR*) and Step 7(2) of Section 7.13.1 of *Directive 056: Energy Development Applications and Schedules*, licensees must submit an electronic copy of the directional survey report to the ERCB if a well deviates from vertical. This report must be submitted immediately upon completing the directional survey and within 30 calendar days of the finished drilling date. Do not include other types of well information with the directional survey report (i.e., tour sheets, logs). Electronic copies must be in PDF format and e-mailed to Well Data Services (WDS) at WellDataServices@ercb.ca. The file name for the attached directional survey report must contain the applicable licence number and the unique well identifier (UWI), and it must be formatted as DS_Licence#_UWI (e.g., DS_0123456_00~13-20-045-12W4~0).

If a well consists of more than nine event sequences, you must submit a directional survey report for all drilling legs that require a directional survey (see Section 4).

2.7 Submitting Gross Completion Intervals

Licensees must report gross completion intervals (GCIs) through PETRINEX and are responsible for submitting correct and accurate GCIs. Licensees must review all GCI values in PETRINEX within fifteen calendar days of when the status is set to "REVIEW" (see Section 5).

2.8 Submitting Other Reports

The ERCB may, if deemed necessary, require a licensee to file additional information relating to the operations of the well for audit purposes or for clarifying electronically submitted drilling and completion data (i.e., well schematics).

3 Electronic Well Drilling and Completion Data Submissions

3.1 Using the ERCB Digital Data Submission System

To satisfy *Directive 059* requirements, licensees must submit electronic summaries of well drilling and completion data of daily operations via the ERCB's DDS system. This data can be submitted by either entering it into one of the system's interactive forms or submitting an XML file that contains data organized into an ERCB-prescribed format.

Electronic submissions are not accepted until all data entry rules are satisfied. These rules ensure that all submitted data are correct and consistent. If submitting data using an

interactive form, submission errors will be identified with messages specific to the error in question. Once a submission is accepted, a page indicating this is displayed with a link to a report listing all data submitted. Print this page for record-keeping purposes. A copy of the page accepting the submission, the report containing the data submitted, and the cover sheet can also be printed from the submission history section of the DDS Web site at a later date. If submitting data by uploading an XML file, you may validate the data prior to submission by using the "Validate File" facility in DDS.

In addition to submitting summary data electronically to the ERCB, licensees must also continue to submit hard-copy (tour) reports of daily drilling and completion operations (see Section 2).

To access the DDS system, go to the ERCB website, www.ercb.ca, under Quick Links : Digital Data Submission. The Well Drilling Completion Data submission section of DDS is under ERCB : Submissions : Well Drilling Completion Data. Look under the related resources section of this page for a user guide and other documents related to using this system.[4]

3.1.1 Well Event Sequences

The current ERCB system can only accept nine event sequences. Until changes to the system are complete, you must select which drilling and producing event sequences to record in the following order:

- first drilling leg
- longest drilling leg
- actively producing/injecting legs

Licensees must also submit a DDS amendment with additional information stating the actual number of drill legs, which drill legs were reported, and which were not. WDS will enter this additional information into the system with the appropriate comments.

Licensees should also note the following:

- Event sequences are assigned chronologically, in the order that they were drilled and completed.
- If multiple pools are completed in the same operation, the lower pool is deemed to be completed first. If a lower pool is completed at a later date, the lower pool carries the subsequent event sequence.

Drilling Activities

Once a new well licence is approved, the system creates a /0 event sequence. If presetting surface casing, the /0 event sequence will be used when the well is eventually drilled to licensed total depth. For multileg wells, the first drilling leg is given the /0 event sequence. Each subsequent drilling leg will be given the next highest event sequence.

[4] See https://www3.cub.gov.ab.ca/cub/wdc/Help/About_WCD.htm for a direct link to the Well Completion Data Submission system's online help guide.

- Ghost holes[5] do not require a well event sequence.
- Upon approval of re-entry operations, the ERCB creates an event sequence other than /0. If a licensee other than the previous licensee is re-entering the well, the ERCB will issue a new licence number. The initial event sequence for this new licence will be the next highest event sequence.
- If additional legs are drilled on a nonabandoned well that has been re-entered or on which drilling has resumed, new event sequences are assigned for each of the additional legs.
- For a well event that has been cased and cemented, regardless of depth, an event sequence must be assigned.
- For a well event that is uncased and uncemented and has hydrocarbon potential, an event sequence must be assigned regardless of depth.
- A well that is uncased and uncemented, has no hydrocarbon potential, does not encounter hydrocarbon, and is less than 150 m does not require a well event sequence.

Completion Activities (all wells)

When completing a well, use the first event sequence for the initial set of perforations. This initial set must include all unsegregated perforations.

Segregated Wells

After the initial completion, additional event sequences are required if

- setting a packer with additional completions in a different pool, or
- performing a production test on a different pool in the wellbore in order to report the test results to the correct pool.

A new event sequence is required

- if the completion operation is in a new pool and is not the first completion of the wellbore,
- if a new completion operation is in a new pool not identified by the ERCB as belonging to Development Entity No. 1, Development Entity No. 2, or self-declared commingling pools, or
- if a drilling well event is deepened into a new pool.

Commingled Wells

- Additional event sequences are optional if the well is commingled in the wellbore and completed within pools identified by the ERCB as belonging to Development Entity No. 1, Development Entity No. 2, or self-declared commingling pools.
- If previous event sequences were created and now commingled, the event sequence numbers remain unchanged and the status of the well must be changed to "COMMINGLED."

[5] See Appendix 1 for the definition of a ghost hole.

- For wells with a previously approved MU order where production is allocated to each pool based on a percentage, the well events remain unchanged and the status of the well is not changed to "COMMINGLED."

3.2 Requirements

The following sections detail what summarized data are required and how the data must be submitted.

1) Account Details

These details must be filled in the first time an account is set up. Unless a change is required, details will remain as entered for all submissions.

a) Contact Name	Enter the name of the person responsible for preparing this submission.
b) Contact Phone/Fax/E-mail	Enter the business telephone and facsimile (fax) number, including area codes, and the e-mail address of the contact person.
c) Acknowledge Submissions by E-mail	Enter Yes if you would like an acknowledgement of your submission automatically e-mailed to you. Enter No if not.

2) Licence Operation

Licensees must fill in data for the following fields once per submission, except for "Submitter Reference" which is optional.

a) Licence Number	Enter the seven-digit licence number of the well, including leading zeroes. Enter the licence prefix or suffix if applicable.
b) Operation Start Date	Enter the date the rig moves on site, including the surface rig to preset surface casing. If the operation involves using more than one rig, enter the date the first rig moves on site. The operation start date does not include setting conductor casing unless the same rig sets surface casing. If the operation does not require a rig, enter the date that the operation begins on site.
c) Operation End Date	Enter the date the rig moves off site, including the surface rig to preset surface casing. If the operation involves using more than one rig, enter the date the last rig leaves the site. If the operation does not require a rig, enter the date that the operation ends on site.
d) Submitter Reference (optional)	Enter the reference number chosen by the submitter for your in-house record keeping.

3) Well Operation

Licensees must check all applicable boxes in each submission.

a) Presetting Surface Casing

Check this box if you are reporting the presetting of surface casing.

Licensees must submit electronic data for the presetting of surface casing to the ERCB within 30 calendar days of concluding the presetting operation (see Section 2.2).

If drilling to licensed depth within 30 calendar days from presetting surface casing, it is considered as one operation and licensees do not need to submit data for the presetting of surface casing separately from data submissions for drilling to licensed total depth.

b) Drilling Operation

Check this box if you are reporting drilling to licensed total depth or re-entry or resumption operations that require a new event sequence.

You must submit electronic drilling data to the ERCB within 30 calendar days of conclusion of the drilling operation.

If, for any reason, a drilling operation is suspended (i.e., rig is released from site) without finishing the intended operation, advise Well Data Services of the suspension by telephone at 403-297-8952 (Option 2) or by e-mail to WellDataServices@ercb.ca. Do not submit data for any operation until the final drilling operation to licensed total depth is complete.

You must supply drilling operation data for each leg (event sequence) of a multileg well.

If the drilling operation results in more than nine event sequences, you must contact Well Data Services at 403-297-8952 (Option 2) or by e-mail to WellDataServices@ercb.ca.

c) Deepening Operation

Check this box if an existing well is being deepened only after the previous drilling operation has been completed and the previous rig has been released. Deepening is a separate operation and does not penetrate a new pool. No new unique well identifier (UWI) is created. Lengthening a wellbore within the same pool is also considered deepening.

You must submit this information to the ERCB within 30 calendar days of the deepening operation's end date.

d) Completion Operation

Check this box if the operation being reported is the initial completion of a well, a workover or recompletion operation, downhole abandonment, or the setting or pulling of packers.

Licensees must submit data for completion operations for each event sequence.

	You must submit this information to the ERCB within 30 calendar days of the finish date of the completion operation.
e) Surface Abandonment Operation	Licensees must electronically submit data associated with surface abandonment within 30 days of completing the abandonment operation within the DDS system under Submissions : Licence Abandonment : Well Licence Abandonment.

4) Presetting Surface Casing

Licensees must fill in data for the following fields when submitting a presetting operation.

a) Spud Date	Enter the date on which drilling the surface hole begins.
b) Casing	Submit the data required for surface casing. (See requirement 7, Casing.)
c) Cementing	Submit the data required for surface casing cementing. (See requirement 8, Cementing).
d) Initial Status Code	Enter the initial status code "Preset" (see Table 1).

5) Drilling

Licensees must fill in data for the following fields when submitting a drilling, resumption, or re-entry operation.

If drilling to licensed depth within 30 calendar days from presetting surface casing, it is considered as one operation; therefore, there is no need to submit preset data separately.

a) Drilling Contractor Code	Enter the drilling contractor's assigned four-character Business Associate (BA) code.[6]
b) Rig Number	Enter the drilling rig number assigned by the contractor.
c) Spud Date	Enter the date on which the drilling of the surface hole begins. Setting conductor pipe is not considered the spud of a well unless conducted by the same drilling rig that continues drilling the remainder of the well or if there is to be no surface casing. For re-entries and resumptions, enter the date operations begin.
d) Finished Drilling Date	Enter the date on which the total depth for the drilling leg is reached. For re-entries and resumptions, enter the date the operation or drilling is completed.
e) Rig Release Date	Enter the date on which all operations are completed and the contractor is released from the well site. For re-entries and resumptions, enter the date the contractor is released from site.

[6] See *ST104A: Business Associate Code List* available on the ERCB website, www.ercb.ca.

f) Kelly Bushing Elevation

Enter the kelly bushing elevation (as built ground elevation plus height of the kelly bushing) in metres.

The system will display an error message if the difference between ground elevation and the kelly bushing is greater than twelve metres (>12).

g) Total Depth

Enter the total depth in metres below kelly bushing (mKB).

h) Initial Status Code

Enter the code for the initial status of the reported event sequence applicable at the end of the operation. This status indicates the state of the wellbore after presetting, drilling, resumption, re-entry, or deepening operations have finished.

If none of the initial statuses in Table 1 are applicable (e.g., for uncased oil sands evaluation wells), enter the code for "Drilled and cased" and submit change of well status data to PETRINEX, indicating the appropriate status.

Table 1. Initial status codes

Code	Initial status	Definition
1	Drilled and cased (DRL&C)	A well that has been drilled and cased but not immediately put on production.
2	Abandoned (ABD)	A well that has either been drilled and had downhole abandonment work completed on or has had both downhole and surface abandonment work completed on. This status can apply to both completed and noncompleted wells.
3	Abandoned and whipstocked (ABDWHP)	For a portion of a well that has been drilled and abandoned and requires an event sequence to be created. A whipstocked leg is then drilled from the original wellbore. If a stratigraphic test well is drilled to locate a formation and abandoned prior to whipstocking to drill to the licensed target, it requires an event sequence to be created.
4	Junked and abandoned (J&A)	Use this status when a well is abandoned due to drilling or mechanical problems. If a well is drilled for the production of oil or gas, injection to an underground formation, or as an evaluation or test hole and is abandoned at a total depth of 150 m or less and is cased and cemented, it is considered a well. You must submit data for this drilling operation to the ERCB. If the rig is to be skidded and a new well spud, you must file an application for a new licence with the ERCB Applications Branch (see *Directive 056*). If a well is drilled for the production of oil or gas, injection to an underground formation, or as an evaluation or test hole and is abandoned at a total depth of 150 m or less and is not cased and cemented, it is not considered a well. You are not required by the ERCB to submit data for this

		drilling operation. If the rig is skidded and the well is respud, the same licence may be used. If a well is drilled for the production of oil or gas, injection to an underground formation, or as an evaluation or test hole and reaches a total depth greater than 150 m, you must submit all drilling and abandonment information with a status of junked and abandoned to the ERCB. If the rig is to be skidded and a new well spud, you must file an application for a new licence with the ERCB Applications Branch (see *Directive 056*).
5	Drain (DRAIN)	More than one event sequence (leg) in a multileg well is open to the same pool and is capable of production. The event sequence considered to be the main contributor of production carries the producing status. The other contributing events carry a drain status. In a resumption or re-entry operation, if one of the event sequences has previously produced and has been assigned a defined pool, it remains as the producing event. The other events carry a drain status.
6	Preset	A well that has had surface casing set and in which drilling has not continued to licensed total depth.

6) Deepening

Licensees must fill in data for the following fields when submitting a deepening operation.

a) Finished Drilling Date — Enter the date total depth is reached for the deepening operation.

b) Total Depth — Enter the total depth of the deepening operation in metres below kelly bushing (mKB).

7) Casing

For any new casing string, the licensee must submit data for all of the fields below.

Licensees must report conductor casing if surface casing is not present or if conductor casing is run to a depth of 30 metres or deeper. Conductor casing must be submitted in conjunction with either surface or intermediate casing. Conductor casing date can be before spud date.

Licensees must duplicate casing from the common portion of the wellbore for each event sequence of a multileg well.

Historical casing refers to casings in pre-existing wellbores prior to a re-entry or resumption operation. If an existing well is being re-entered or resumed, licensees must show historical common casings on the new legs.

For both historical and common casings, entering the casing date, grade, and density are optional.

If an open hole and or liner exists after the completion of drilling or completion operations, licensees must indicate all the applicable open hole, slotted liner, and multistage fracture intervals in the completion record.

After casing a leg, if a subsequent leg is drilled and sidetracks above the previous casing shoe (e.g., through a window in the casing) and the sidetrack leg is uncased (i.e., open hole), indicate the shoe of the casing for the sidetrack leg as the start of the sidetrack. Do not indicate the shoe of the previous casing as it is not applicable to the sidetrack leg (see Appendix 4).

If a mixed (i.e., more than one casing grade steel process, grade yield strength, density, or diameter) casing string is run, enter two casing records to represent the extremes of the diameters, densities, and grades. See Appendix 4, Section B, for an example and further details.

a) Casing Date

Enter the dates the casings or liners (i.e., cemented or landed, if uncemented) were set, in chronological order.

b) Casing Code

Enter the casing code that corresponds to the type of casing being reported (see Table 2).

Table 2. Casing codes

Code	Casing type
1	Conductor
2	Surface
3	Intermediate
4	Production
5	Liner

c) Casing Liner Outside Diameter

Enter the outside diameter for each casing or liner in millimetres.

d) Casing Grade Steel Process

Enter the casing grade steel process for each casing or liner in alpha characters.

e) Casing Grade Yield Strength

Enter the casing grade yield strength for each casing or liner in numeric characters.

f) Casing Density

Enter the linear density (weight) of the casing or liner in kilograms per metre.

g) Shoe Set Depth

Enter the shoe set depth of the casing or liner in metres below kelly bushing (mKB).

h) Liner Top Depth

Enter the depth the liner is hung at in metres below kelly bushing (mKB).

8) Cementing

For cementing operations associated to new casing string, the licensee must submit data for all of the fields below.

Record cements in the order they are pumped into the well. For each casing run, there may be several records of cementing details. You must add multiple cement records to a single casing record if more than one cementing operation was required to cement the casing.

If re-entering or resuming an existing well, you do not have to submit historical cement details common to the new legs being drilled.

a) Cement Code

Enter the cement code for the type of cement used (see Table 3). Codes 01-42 indicate the principal component of the cement and do not include additives (e.g., accelerators). Codes 91 and 92 indicate that the casing or liner is not cemented.

Table 3. Cement codes

Code	Cement type
01	Class A
03	Class C
04	Class G
06	1:1:2
07	1:1:4
30	Thermal cements
31	Thixotropic cements
36	Foamed cement
40	Cap cement (capping foamed cement)
42	Lightweight cements
91	Uncemented slotted liner
92	Uncemented casing

b) Cement Amount

Enter the amount of cement used.

c) Cement Unit Code

Enter the unit of measurement used for the cement (see Table 4).

Table 4. Cement unit codes

Code	Cement unit
1	Cubic metres
2	Tonnes
3	Sacks
4	Litres
5	Metres

d) Interval Top

Enter either the estimated or actual top of the interval in the wellbore that is cemented in metres below kelly bushing (mKB).

If the cement extends to ground surface, enter 0.

e) Interval Base

Enter either the estimated or actual base of the interval in the wellbore that is cemented in metres below kelly bushing (mKB).

9) Core[7]

Licensees must submit the corresponding core record for every core cut, except for cores cut in oil sands areas. Cores from oil sands areas are usually cut in multiple runs six metres long over the entire cored interval (typically 80-90 metres in length). For cores cut in oil sands areas, record the entire cored interval as one core interval, indicating the top and base of the bulk interval.

If submitting details on a sidewall core, licensees must enter the details for "Interval Top." Leave "Interval Base" blank.

Report cores cut in the common portion of a multileg well only in the first applicable well event sequence. For example, if a core is cut on a section of the wellbore that is common to drilling legs 2, 3, and 4, licensees must only record the core on leg 2.

a) Core Number

Enter the number of the cores cut in the chronological order that they are cut.

[7] For more information on requirements for submitting cores to the CRC, see Part 11, Section 11.030 of the *Oil and Gas Conservation Regulations*.

If additional cores are cut on a new leg (event), they must be numbered beginning at 1.

b) Sidewall

Click Yes if the coring method used is sidewall.

Click No if the method used is other than sidewall.

c) Interval Top

Enter the top of the interval of the wellbore that was cut in metres below kelly bushing (mKB).

d) Interval Base

Enter the base of the interval of the wellbore that was cut in metres below kelly bushing (mKB).

10) Drillstem Test

If a test has been conducted or attempted, licensees must submit a drillstem test record. Do not submit a drillstem test record if you have already submitted details on drillstem tests to the ERCB through the Well Test Capture system in DDS.[8]

a) Test Number

Enter the number of the test runs completed in chronological order. You must report drillstem tests that are determined to be misrun.

If additional tests are run on a new leg (event sequence), they must be numbered, beginning at 1.

b) Test Type Code

Enter the code for the type of test conducted (see Table 5).

Table 5. Test type code

Code	Test type
1	Bottomhole
2	Straddle
7	Closed chamber

c) Interval Top

Enter the top of the interval of the section of the wellbore tested in metres below kelly bushing (mKB).

d) Interval Base

Enter the base of the interval of the section of the wellbore tested in metres below kelly bushing (mKB).

11) Directional Drill Event (DDE)[9] (formerly kickoff point [KOP] in this directive)

Note that for data submission through the DDS system, the term kickoff is still being used.

All inclination angles are measured from vertical (0° = vertical).

Do not record instances of deviation less than five (5) degrees. The only exception would be where a "Sidetrack Fish" DDE is required; this must be submitted regardless of deviation.

[8] You will get an error message if the ERCB has already received a drillstem test record through the ERCB's Well Test Capture system in DDS.

[9] DDE details are important for Alberta Department of Energy royalty measured depth calculations.

Initial Drilling Leg

If the inclination angle reaches 5 degrees and is less than 80 degrees:

- *Submit a DDE (reason: "Deviate"). The depth of the DDE must be the depth where the well inclination first becomes greater than or equal to five degrees (≥5°). For slant wells, submit the DDE at 0 mKB.*

If the inclination angle reaches 80 degrees:

- *Submit a DDE (reason: "Horizontal"). The depth of this DDE must be the depth where the well inclination first becomes greater than or equal to eighty degrees (≥80°). If the inclination does not reach 80 degrees, a "Horizontal" DDE is not required.*

Subsequent Drilling Legs

Where a drilling leg is sidetracking from an existing leg, submit a DDE where the leg sidetracks regardless of the inclination angle. The DDE reason must be "Deviate" if the maximum inclination angle of the sidetrack drill leg is less than 80 degrees and "Horizontal" if the maximum inclination angle is greater than or equal to 80 degrees.

Additional Information

Licensees must also

- *submit a DDE "Sidetrack fish" on the sidetrack leg, not the leg in which the fish was lost, if a fish is left in a hole and has to be drilled around. If the sidetrack leg is drilled horizontally, submit another "Horizontal" DDE with the same depth and date as the "Sidetrack fish" DDE. This allows the ERCB to conduct a horizontal evaluation;*
- *duplicate DDEs from the common portion of the wellbore for each event sequence of a multileg well (e.g., if the bit passes through a common DDE on its way to the subject drilling leg, then that common DDE must be recorded under the subject drilling leg);*
- *submit historical DDEs that occurred on a re-entered or resumed wellbore; and*
- *submit a directional survey (see Section 4) for well events where the inclination angle is five (5) degrees or greater.*

See Appendix 4 for submission examples.

a) Directional Drill Event Date

Enter the dates that DDEs occurred in chronological order.

When reporting a common DDE, submit the original date the directional drill event was drilled.

b) Directional Drill Event Depth

Enter the depth of the DDE in metres below kelly bushing (mKB).

c) Directional Drill Event Reason Code

Enter the code indicating the reason for the DDE (see Table 6).

Table 6. DDE reason codes

Code	Reason	Notes
1	Deviate (≥5° and <80°)	
2	Sidetrack fish	Submit for the sidetracked leg not the leg in which the fish was lost.
4	Horizontal (≥80°)	

12) Plug Back

Licensees must submit data for all the following fields after performing a plug back operation.

The licensee must only record packing devices or plugs left in a well at the end of an operation. Do not record cement plugs run in a leg of a well not considered a drilling event (i.e., a ghost hole).

When plugging is performed during drilling, the licensee must record plugs under "Plug Back." When plugs are set after drilling, the licensee must record them under "Completions."

The licensee may use a 3 metre high-density cement plug (e.g., resin-based low permeability gypsum cement) if the plug length is an operational issue. Preapproval from the ERCB Well Operations Group is required for plugs less than 3 metres.

a) Plug Back Date

Enter the dates that the plug was run in chronological order.

b) Plug Back Purpose Code

Enter the code for the purpose of the cement operation (see Table 7).

Table 7. Plug back purpose codes

Code	Plug-back purpose
1	Abandon
3	Plug back and case
4	Plug back and whipstock
5	Plug back and sidetrack (fish)
6	Plug back and straighten
7	Lost circulation plug (not drilled out)

c) Interval Top

Enter the top felt depth or drilled-out depth of the cement plug in the wellbore in metres below kelly bushing (mKB). If the plug is not felt, enter the estimated interval top.

d) Interval Base

Enter the base of the cement plug in metres below kelly bushing (mKB).

e) Cement Amount

Enter the amount of cement used.

f) Unit Code

Enter the code for the unit of measurement used for the cement (see Table 4).

g) Method Code

Enter the code for the method used for the abandonment or plugback (see Table 8).

Table 8. Method codes

Code	Method
3	Rerun plug
51	Cement plug
53	Packing device capped with cement
57	Packing device capped with resin/gypsum cement

h) Log Tag Code

Enter the code for the method by which the plug was felt (see Table 9).

Table 9. Log tag codes

Code	Method	Notes
1	Log	Logged immediately after plug is run
2	Tag	Tagged after cement plug has set
3	Not felt	Not logged or tagged

13) Operation Incident

Licensees must include an operation incident record for all Directive 059 *electronic submissions.*

If there is no indication of kicks, blowouts, or circulation losses on the daily operations reports, licensees must use occurrence type code 99, "No incident encountered" (see Table 10).

Water flows or artesian flows are considered blowouts, except in cases where a blowout preventer (BOP) is present. Submit the water flow as a "Kick" if encountered with a BOP on the well. Submit it as a "Blowout" in the absence of a BOP.

a) Occurrence Type Code

Enter the code describing the occurrence you are reporting (see Table 10).

Table 10. Occurrence type codes

Codes	Occurrence
10	Kick
30	Blowout
40	Lost circulation
99	No incident encountered

b) Operation in Progress Code

Enter the code for the operation in progress when the incident began (see Table 11).

Table 11. Operation in progress codes

Code	Operation	Code	Operation
1	Drilling	5	Tripping in
2	Circulating	6	Tripping out
3	Coring	7	Running casing
4	Logging	8	Testing

c) Occurrence Date

Enter the date the incident began.

If no incidents were encountered, enter the "Finished Drilling Date" or the date of the last operation.

d) Occurrence Depth

Enter the total depth the well was at when the incident began in metres below kelly bushing (mKB).

e) Occurrence Mud Density

Enter the density of fluid in the wellbore when the incident began in kilograms per cubic metre (kg/m^3).

If there was no fluid in the wellbore at the time of the incident, enter 800.0 kilograms per cubic metre (kg/m^3).

f) Controlled Date

Enter the date the incident was controlled.

g) Controlled Depth

Enter the total depth the well was at when the incident was controlled in metres below kelly bushing (mKB).

h) Controlled Mud Density

Enter the density of the fluid in the wellbore when the incident was controlled in kilograms per cubic metre (kg/m^3).

If a cement plug was used to control the incident, enter 2499. If casing was used, enter 2500.

i) Lost Circulation Total Fluid

If you are recording a lost circulation, enter an estimate of the volume of fluid lost during the incident in cubic metres (m^3).

14) Completion

Licensees must submit data for all applicable fields after performing a completion operation.

For packing devices, codes 51, 52, 53, 55, and 57 in Table 12, indicate partial or full abandonment.

If the purpose of the operation is to abandon a pool, submit the appropriate packing device, plug, or cement squeeze record and enter the abandonment code from Table 13 and the log tag code from Table 9.

a) Completion Date

Enter the date of each operation performed in chronological order.

b) Operation Type Code

Enter the code for the type of operation performed (see Table 12).

Table 12. Operation type codes

Code	Operation	Interval recorded	Notes
2	Perforation	Perforated intervals	For standard perforations. Can also be for radially drilled slots.
5	Hydrajet perforation	Cut intervals	For sand notching or water-jetted slots. Shots per metre not required.
7	Slotted liner	From the shoe of the previous casing to the shoe of the liner. If recording a liner that is part of a casing string, from the top of the slotted interval to the shoe of the liner.	A liner casing record and an uncemented slotted liner cementing record must be submitted.
8	Open hole/barefoot completion	From the shoe of the previous casing or liner to the total depth. If recording a milled-out section of casing, from the top of the interval to the base of the interval.	If a portion of the open hole has a liner, only record intervals that remain open. Any uncemented gap between the last casing or liner shoe and total depth that can contribute to production is a reportable open hole section.
9	Casing vent production	Vent flow intervals.	
12	Acid treatment	Treated completed intervals.	
23	Chemical squeeze	Treated completed intervals.	
24	Alcohol squeeze	Treated completed intervals.	
41	Fracture	Treated completed intervals.	For every code 41 fractured interval, a fracture fluid data submission is required. See Section 4.

(continued)

Code	Operation	Interval recorded	Notes
42	Multistage fracture	From the top of the interval to the base of the interval (for each individual open port, fractured or not). If there is only one depth for the port, use this as the interval top and add 0.1 metres to obtain the interval base for the port (e.g. top = 1500; base = 1500.1).	For every code 42 fractured interval, a fracture fluid data submission is required. See Section 4.
43	Multistage fracture—port closed	For each closed code 42, a code 43 must be recorded. The intervals used for code 43 must be the same as those recorded for code 42.	For a previously open fracture port or blast port that is now closed.
51	Cement plug	Interval of plug.	Use for cement, bentonite, or grout plugs.
52	Cement squeeze (only record if successful)	Cemented completed intervals.	Use a cement squeeze to show the covered interval.
53	Packing device (cement retainer, bridge plug) capped with cement	From the top of the cement to the top of the packing device.	
54	Casing patch	Completed interval covered by patch.	Only record if it covers a completed interval. Do not record casing repairs.
55	Packing device (cement retainer, bridge plug, whipstock packer) with no cement	From the top of the packing device to the bottom of the packing device.	Packing device with no cement used for zonal abandonment. Requires ERCB approval.
56	Remedial casing cementing (only record if successful)	Cemented completed intervals.	For cements squeezed through perforations to get behind the casing to fix a casing leak or failure. Do not record if the cement is squeezed through a casing tear.
57	Packing device (i.e., cement retainer, bridge plug, whipstock packer) capped with resin-gypsum cement	From the top of the cement to the top of the packing device.	

c) Interval Top

Enter the top of the interval in metres below kelly bushing (mKB).

d) Interval Base

Enter the base of the interval in metres below kelly bushing (mKB).

e) Shots per Metre

If the well is perforated, enter the number of shots/slots per metre.

f) Cement Amount

Enter the amount of cement used.

g) Cement Unit Code

Enter the code for the unit of measurement used for the cement (see Table 4).

h) Abandonment Code

Enter the code for the purpose of the cementing operation (see Table 13). If the cementing operation was to suspend a pool, leave this field blank.

Table 13. Abandonment codes

Code	Abandonment
1	Abandon
2	Abandon zone
4	Plug back and whipstock

i) Log Tag Code

Enter the code for the method used to locate the cement plug (see Table 9).

15) Packer

Licensees must submit data for all of the following fields after setting or pulling a packer.

Licensees must record packers on the drilling event sequence. For example, if a packer is set in both the /0 event sequence (drilling) and the /2 event sequence (producing) in the same operation, both packers must be recorded on the /0 event sequence.

Only report the packers that are set in the wellbore and remain at the end of the operation.

Licensees must record the setting or pulling of any packers in the common wellbore of a multileg well on each drilling event sequence that shares the common wellbore.

Record any previously set packers that are pulled or pushed downhole in this operation as "Pulled."

Do not report external casing packers. However, if the packers, as part of a completion assembly within a cased hole, enable different pools to be tested individually, then they must be recorded.

Submit changes under the packer type "Historical Packer" as an amendment.

Do not record anything in packer data that has also been recorded in the completion record (e.g., packing devices capped with cement).

a) Packer Date

Enter the date(s) that the device was set or pulled in the well in chronological order.

b) Packer Operation

Click "Pulled" (for submission by file, enter code P) if a previously set device is removed from the well during this operation.

Click "Set" (for submission by file, enter code S) if a device is set during this operation and remains at the end of the operation.

Click "Modify" (for submission by file, enter code M) if the data for a device is to be modified. An operation incident record is not required for a "Modify" submission.

c) Packer Code

Enter the code for the type of packer (see Table 14).

Table 14. Packer codes

Code	Packer Type	Notes
1	Packer	For retrievable or permanent packers
2	Bridge plug or whipstock packer	
3	Cement retainer	
4	Through-tubing packer	
5	Through-tubing bridge plug	

16) Surface Abandonment

Licensees must submit data for all the following fields after performing the surface abandonment of a well. Within DDS, this data must be submitted under "Licence Abandonment."

a) Well Type	Select "Cased hole" or "Open hole."
b) Original Surface Abandonment Date	Enter the date the surface abandonment was completed.
c) Surface Abandonment Method	Select "Cement and plate," "Plate," or "Other method."
d) Oil Sands Area	Select Yes or No.
e) H_2S	Select Yes or No.
f) Routine Abandonment	Select Yes or No.
g) Groundwater Base	Enter groundwater base of protection in metres below kelly bushing (mKB).
h) Groundwater Protection Method	Select "Behind surface casing," "Casing removed and plug set," Covered by cement," "Remedial cementing," or "Requirement waived."
i) Reabandonment	Select Yes for all abandoned licences that are being re-entered for repair only. Select No for all active licences, regardless of whether or not the licence was previously abandoned.

17) Amendment Request

To make a change to previously submitted data, licensees must submit an amendment request electronically in the DDS system. ERCB Well Data Services staff will manually update the data within the ERCB database.

a) Licence Number	Enter the licence number of the unique well identifier (UWI) that you are amending.
b) Unique Well Identifier (UWI)	Enter the full UWI for the event sequence affected by the amendment.
c) Details	In the free-form section, describe each required addition, deletion, or correction in detail. Identify the data before and after the amendment. If the amendment affects multiple UWIs (i.e., event sequences) of the same well licence, enter one UWI (e.g., /0) in the UWI boxes. Clearly list the required amendments for each of the affected event sequences in the free-form section.

4 Electronic Submission of Fracture Fluid Composition and Water Source Data

4.1 Background

Electronic submission of data regarding fracturing operations was previously limited to fracture interval and date. This section sets out the requirements for the electronic submission of fracture fluid composition and water source data.

4.2 Using the ERCB Digital Data Submission System

Licensees must submit summaries of fracture fluid composition and water source data via the ERCB's DDS system.

- For nine or fewer well event sequences, these data may be submitted either through one of the system's interactive forms or in a CSV or XML file that contains the data organized into an ERCB-prescribed format.

- For well event sequences greater than nine, these data may only be submitted through forms on the DDS system and not in a CSV or XML file.

Electronic submissions are not accepted until all data entry rules are satisfied. These rules ensure that all submitted data are correct. If submitting data using an interactive form, submission errors will be identified with messages specific to the error in question. Print this page for recordkeeping purposes. If submitting fracture fluid composition or water source data by uploading a CSV or XML file, you may validate the data prior to submission by using either the "Validate and Submit Fracture Fluid by File" or the "Validate and Submit Water Source by File" function in the DDS system. Once a submission is accepted, a page indicating this is displayed that lists all the data submitted.

In addition to submitting summary data electronically to the ERCB, licensees must also continue to submit hard-copy reports of fracturing operations (see Section 2).

To access the DDS system, go to the ERCB website, www.ercb.ca, under Quick Links : Digital Data Submission. Fracture Fluid Composition and Fracture Fluid Water Source Data are two submenus in the Well Drilling Completion Data submission section of DDS. Look under the related resources section of this page for the user guide and other documents related to using this system.[10]

4.3 Requirements

4.3.1 Fracture Fluid Composition Data

For each fracture operation that is submitted as a code 41 (Fracture) or code 42 (Multistage fracture), licensees must submit the following fracture fluid composition data per fracture record.

[10] See https://www3.eub.gov.ab.ca/eub/wdc/Help/About_WCD.htm for a direct link to the Well Completion Data Submission system's online help guide.

a) Fracture Scenario

This is the configuration of the hole when the fracture operation was conducted, e.g., vertical single stage, which indicates that the fracture operation was in a vertical wellbore and used one stage. Select from the list in the user guide.

b) Service Provider

This is the name of the company contracted by the licensee to conduct the fracturing operation. If there is more than one company involved, indicate the main fracturing contractor only. Select from the list in the user guide.

c) Fracture Components

These are the carrier fluids, proppants, and additives of the fracture fluid. Carrier fluids, proppants, and additives must be submitted per fractured interval.

Component Type

Component Type	Notes
Carrier fluid	Main fracture fluid component
Proppant	Used to keep fractures open
Additive	Used to facilitate fracturing

i) Carrier Fluid

When Carrier Fluid is selected, enter the following data:

- Fluid Type

  Select the carrier fluid from the list in the user guide.

- Volume

  Enter the carrier fluid volume used in cubic metres.

ii) Proppant

When Proppant is selected, enter the following data:

- Proppant Type

  Select the proppant type from the list in the user guide.

- Trade Name

  Enter the trade name of the proppant, i.e., the name that the supplier uses to identify the proppant.

- Supplier

  Enter the name of the proppant supplier.

- Size

  Select the size of the proppant from the list of mesh sizes.

- Weight (metric tonnes)

  Enter the weight of proppant used in metric tonnes.

iii) Additive

When Additive is selected, enter the following data:

- Trade Name

  Enter the trade name of the additive, i.e., the name that the supplier uses to identify the additive.

- Supplier

  Enter the name of the additive supplier.

- Purpose

  Select the purpose of the additive from the list. If an additive has more than one purpose, select the primary purpose.

- Volume/Weight

  Enter the volume or weight of the additive used.

- Unit of Measure

  Select the unit of measure for the additive from the list in the user guide.

d) Component Ingredients

Each component-type record must have one or more component ingredients attached. For each component-type record, the maximum concentration of all ingredients must total a minimum of 100 per cent. For each fractured-interval record, the maximum concentration in the hydraulic fracturing fluid indicates the maximum concentration of all ingredients in all component types and must be a minimum of 100 per cent.

For each ingredient, submit the following information:

i) Trade Secret

Indicate if the ingredient is considered a trade secret.

Indicate if the ingredient is hazardous under the Government of Canada's Workplace Hazardous Material Information System (WHMIS) or nonhazardous.

If the ingredient is a trade secret and is considered hazardous,

- in the Hazardous Materials Information Review Commission (HMIRC #) field, enter the HMIRC number indicating that the ingredient is exempt from the

HMIRC requirement to disclose the chemical identity or concentration of the ingredient on the basis that it is confidential business information (i.e., a trade secret), and

- in the Ingredient Name field, enter the chemical family name of the ingredient.

If the ingredient is a trade secret and is considered nonhazardous,

- in the Chemical Abstract Service # field, enter "trade secret," and
- in the Ingredient Name field, enter the chemical family name of the ingredient.

ii) Nontrade Secret

If the ingredient is not considered a trade secret,

- enter a valid CAS # in the appropriate format (if the ingredient has no CAS #, enter "Not available"), and
- in the Ingredient Name field, enter the ingredient name.

iii) Maximum Concentration in Component (% by mass)(required for all ingredients whether or not a trade secret)

Enter the maximum concentration of the ingredient in the component type (i.e., carrier fluid, proppant, or additive).

iv) Maximum Concentration in Hydraulic Fracturing Fluid (% by mass) (required for all ingredients whether a trade secret or not)

Enter the maximum concentration of the ingredient in the hydraulic fracturing fluid.

Fracture fluid composition data submitted by a licensee in accordance with this section will be treated as nonconfidential by the ERCB. Licensees are solely responsible for the identification and removal of information about any ingredients that are considered trade secrets. By submitting fracture fluid composition data, a licensee is confirming to the ERCB that the information reported under this section is not considered a trade secret by the licensee or a third party.

The ERCB may, at its discretion and at any time, require licensees to provide additional information about component ingredients used in hydraulic fracturing operations regardless of whether such information is considered or has been identified as a trade secret. This information will be collected, used, and disclosed in accordance with the *Freedom of Information and Protection of Privacy Act*. Identification by a licensee of trade secret information under this directive does not mean that the information will be held in confidence or otherwise protected by the ERCB, nor does it mean that the information meets any criteria or legal test for establishing that the information is a trade secret or that it is confidential business, scientific, or technical information.

4.3.2 Fracture Fluid Water Source Data

For each UWI that has fracture operations submitted as code 41 (Fracture) or code 42 (Multistage fracture), licensees must submit the following fracture fluid water source data.

For fracture operations that have not used water as part of the carrier fluid, fracture fluid source data do not have to be submitted.

a) Water Type

The Water Type classifies the water source according to salinity and location. For a complete description of water types, consult the user guide.

b) Source Information

See below and the user guide to determine what source information data are required for each water type.

i) Latitude

Enter the latitude (NAD83) of the water source location in degrees to 5 decimal places (e.g., 51.45612°).

ii) Longitude

Enter the longitude (NAD83) of the water source location in negative degrees to 5 decimal places (e.g., -114.56891°).

iii) DLS Location

This will be autopopulated based on the latitude and longitude entered above.

iv) Major Basin

The major river basin in which the water source is located will be autopopulated based on the latitude and longitude entered above.

v) Major Subwatershed

The major subwatershed in which the water source is located will be autopopulated based on the latitude and longitude entered above.

vi) Name of Water Body

If applicable, select the surface water body from which the water was extracted from the list of water bodies within a 200 metre radius of the source location. This list is populated based on the entered source latitude and longitude.

vii) Name of Geologic Zone

Select the geologic zone from which the groundwater was extracted from the list in the user guide.

viii) Name of Supplier (Town/Company)

Enter the name of the town or company that supplied the water. For ERCB-licensed facilities, this will be autopopulated from the Reporting Facility ID.

ix) Name of Facility

Enter the name of the facility from which the water was extracted, if applicable. For ERCB-licensed facilities, this will be autopopulated from Reporting Facility ID.

c) Water Source Administrative Information

i) Diversion Authorization Type

Enter the diversion authorization type for the water source, if applicable.

Note that use of nonsaline water for oil and gas purposes must comply with the *Water Act*, which requires authorization from Alberta Environment and Sustainable Resource Development (ESRD). See the ESRD website for information on water diversion authorization processes to ensure that nonsaline water use complies with all applicable requirements.

ii) Diversion Authorization ID

Enter the diversion authorization ID for the water source, if applicable.

iii) Water Well ID

Enter the Water Well ID number, if applicable.

Note that the *Water (Ministerial) Regulation* requires water well drilling reports to be submitted to ESRD for all water wells drilled in Alberta.

iv) ERCB Well UWI

Enter the ERCB unique well identifier (UWI) for the water source well, if applicable.

v) ERCB Reporting Facility ID

Enter the ERCB Reporting Facility ID for the water source facility, if applicable.

vi) ERCB Facility Licence

For ERCB-licensed facilities, this will be autopopulated from Reporting Facility ID.

d) Volume and Quality

i) Start Date of Diversion

Enter the date when water started to be extracted from the water source for use in the fracturing of the specified UWI.

ii) End Date of Diversion

Enter the date when extraction of water from the water source for use in the fracturing of the specified UWI ended.

iii) Average Daily Diversion Rate

Enter the average daily diversion rate in cubic metres for the water source.

iv) Maximum Diversion Rate

Enter the maximum diversion rate for the water source in appropriate units (cubic metres per day for groundwater types, cubic metres per second for surface water types).

v) Total Volume

Enter the total volume of water in cubic metres for each individual water source.

vi) Total Dissolved Solids (TDS) Content

For each groundwater source, enter the TDS content in milligrams per litre.

4.3.3 Wells with Greater than Nine Event Sequences

Drilling well event sequences greater than nine must have fracture fluid composition per fracture interval and water source data per UWI submitted through the DDS system. The following data must be submitted by the licensee followed by the fracture fluid and water source data in accordance with Sections 4.3.1 and 4.3.2.

Drilling well event sequences greater than nine may not be submitted unless well event sequences 0 and 2–9 have already been assigned. This includes drilling and producing well event sequences.

a) UWI for Well Event Sequences Greater Than Nine

Enter a UWI for each well event sequence greater than nine that has had fracturing operations completed. The UWI must represent the bottomhole location of the well event sequence to which it applies.

b) Well Name

Enter the well name.

c) Total Depth

Enter the total depth in metres below kelly bushing for the well event sequence greater than nine.

d) Finish Drill Date

Enter the date on which the total depth for the well event sequence was reached.

e) Fracture intervals

The following data must be submitted for each fractured interval for drilling well event sequences greater than nine. The same rules apply for submitting multistage fracture port intervals as for wells with nine or fewer drilling events (see Appendix 4, Section D).

i) Perf Treatment Type

Enter the perforation treatment type as either "Fracture" or "Multistage Fracture."

ii) Top Depth

Enter the top depth of the fractured interval in metres below kelly bushing.

iii) Base Depth

Enter the base depth of the fractured interval in metres below kelly bushing.

iv) Perf Treatment Date

Enter the date the interval was fractured.

v) Service Provider

Select from the list the name of the company contracted by the licensee to conduct the fracturing operation. If there is more than one company involved, indicate the main fracturing contractor only.

4.3.4 Data Amendments

Changes to submitted fracture fluid composition or water source data can be made through the DDS system.

For nine or fewer drilling well event sequences, most data submitted through the Fracture Fluid Composition Data and Fracture Fluid Water Source Data forms can be amended by selecting "Submit Fracture Fluid Amendment" or "Submit Water Source Amendment." The exceptions are UWI, treatment type, top depth, base depth, and Perf date. These data can be changed through the DDS Well Drilling Completion Data form by selecting "Submit Amendment" following the details under Section 3.2.

For drilling well event sequences greater than nine, all data submitted through the Fracture Fluid Composition Data and Fracture Fluid Water Source Data forms can be amended including well name, treatment type, top depth, base depth, perforation date, and UWI.

5 Directional Survey Submission

5.1 Background

In drilling a nonvertical well, the licensee of the well may periodically use a downhole instrument to gather data, such as the measured depth, inclination, and azimuth, on the wellbore. Such surveys are plotted and maintained by the ERCB as an engineering and legal record of the well's trajectory, bottomhole location (UWI), and maximum true vertical depth (max TVD).

In accordance with Section 6.030 of the *OGCR*, licensees, immediately upon the making of a directional survey, must send a copy of the report to the ERCB. This section contains the requirements for submitting this report to the ERCB and outlines

- when a licensee must complete a directional survey report,
- what information must be included in the report, and
- when and how a licensee must submit a directional survey report to the ERCB.

5.2 Requirements

5.2.1 General Requirements

If a directional survey is run on a well, licensees must complete and submit an electronic copy of the directional survey report for each drilling leg to the ERCB within 30 calendar days of the finished drill date. If the wellbore consists of more than nine event sequences, the licensee of the well must submit a directional survey report for all drilling legs that require a directional survey. If the last measurement taken is at an interval no more than 150 metres from the total depth, licensees must extrapolate the data from the directional survey to total depth.

Licensees must not include other types of well information with the directional survey report (i.e., tour sheets, logs).

1) Licensees must complete and submit a directional survey report
   a) when drilling a new wellbore
      i) if the type of drilling operation on the well licence application is directional, horizontal, or slant (i.e., using a drilling rig with the mast inclined at an angle other than vertical while drilling) or
      ii) if submitting a directional drill event (see Section 3.2);

   and

   b) when drilling on deepenings, re-entries, or resumptions
      i) if deepening by 150 metres or more, include the survey to the new total depth
      ii) if additional drilling is less than 150 metres and no directional survey was run, submit the original directional survey and the projected survey to the new total depth

The licensee of a well is not required to submit a directional survey report for

- producing events (i.e., pools) or
- wells intended to be vertical that go off track and reach an inclination angle of at least five degrees and are then plugged back and straightened.

All directional surveys submitted to the ERCB must be final. The ERCB will not accept intermediate, interim, and proposal directional surveys or deviation surveys in place of a directional survey report. Electronic copies must be in PDF format and submitted by e-mail to Directional.Surveys@ercb.ca or WellDataServices@ercb.ca.

5.2.2 Additional Requirements for Multilegged Wells

2) For subsequent drilling legs (i.e., /2, /3 etc.), the licensee must include the upper portion of the directional survey (i.e., from kelly bushing to tie-on point[s]) in the report it submits to the ERCB so that the record for each leg is complete from kelly bushing to total depth.

On directionally drilled multilegged wells, the UWI of any vertical drill leg (e.g., stratigraphic or sump leg) will be amended by the ERCB if one of the following applies:

- A directional survey report is received for the vertical well, even if not required. The ERCB will determine the UWI from the directional survey report.
- No directional survey report is available and the licensee has disclosed that the drill leg is vertical. The ERCB will determine the UWI to be the same as the surface hole location.

5.2.3 Minimum Reporting Requirements

3) Within the header of the directional survey report, the licensee of a well must indicate
    - the well licence number;
    - the UWI (at the time of submission);
    - the surface hole location based on the Alberta Township System, including the legal subdivision, section, township, range, and meridian;
    - the NAD83 coordinates of the surface hole location from the final site survey plan;
    - the convergence angle at the surface hole location (convergence angle must be calculated using standard Universal Transverse Mercator [UTM] algorithm);
    - the survey company/organization's name; and
    - the type of surveying tool used, e.g., measurement-while-drilling, gyroscope, single shot, etc.

5.2.4 Data Submission Requirements

4) For each directional survey point, vertex, or station, licensees must submit original directional survey measurements for
    - the measured depth,
    - the inclination angle, and
    - the azimuth.

5) For each directional survey point, vertex, or station, the licensee of a well must submit the following:

- the distance east or west, relative to the surface hole, with no false easting added (positive for east, negative for west);
- the distance north or south, relative to the surface hole, with no false northing added (positive for north, negative for south); and
- the true vertical depth.

6) Licensees must record the kelly bushing as a point, vertex, or station. The kelly bushing recorded must be the depth origin (i.e., depth is 0.0 m) of the directional survey.

7) Licensees must record ground surface as a point, vertex, or station. This is the location origin (i.e., local offset coordinates 0 m N/S, 0 m E/W) of the directional survey.

8) Licensees must record a point, vertex, or station at least every 150 m from the point at which directional survey tools are run.

9) Licensees must mark tie-on point(s). For wells with a preset surface hole, the tie-on point to drill directionally to total depth must be at ground surface where the inclination and the azimuth are assumed to be 0.

10) Licensees must project the final survey measurement to the total depth and record it as a point, vertex, or station.

11) Licensees must measure and calculate all coordinates from the centre of the well at the surface location.

12) Licensees must record the date the survey was completed, i.e., when the last survey measurement was taken.

5.2.5 Standards

13) Licensees must use the following standards in directional survey reports:

- International metric system units—linear units must be in metres to two decimal places and angular units of latitude and longitude must be in degrees to a minimum of six decimal places.
- Azimuthal reference must be true north.
- Survey calculation method must be minimum curvature.
- Coordinate forward/inverse conversion between geographic coordinates (latitude and longitude) and projected coordinates (easting and northing) must use the standard UTM algorithm.

6 Gross Completion Intervals

6.1 Background

Values for GCIs must indicate completed intervals for perforations, open-hole completions, slotted liners, or multistage fractures open to pool(s) or deposit(s) that contribute to production or are being injected or tested. This information is submitted to PETRINEX.

6.2 Requirements

6.2.1 General Requirements

1) When reporting the values for GCIs, the licensee must
   a) submit the GCIs for each producing or injecting well event;
   b) submit the depth for the top and base of the GCIs for the well event sequence in metres from the kelly bushing (mKB);
   c) report the top and base of the GCI and ensure that they align with the appropriate perforation, slotted liner, open hole, or multistage fracture intervals;
   d) only report the completed interval (do not report pay, permeable, or porous intervals); and
   e) ensure that GCIs within PETRINEX match the current open intervals when submitting completion data indicating open intervals for perforations, slotted liners, open holes, or multistage fractures. Licensees must also ensure that the GCI in PETRINEX is updated to match the remaining open intervals when closing an open interval.

6.2.2 ERCB Review of GCI Values in PETRINEX

2) The licensee of the well must review all GCI values in PETRINEX within fifteen calendar days of the status being set to "REVIEW" and correct any errors that may exist.

The ERCB will continue to review GCI values where the GCI status is "PENDING." The ERCB will set the GCI status to "CONFIRMED" if it agrees with the GCI values or "REVIEW" if further review is deemed necessary. Any GCI value with a status other than "CONFIRMED" is not considered a valid submission.

6.2.3 GCI Reporting for Commingled Wells

3) If commingling multiple pools, the licensee must report the GCI from the top of the uppermost commingled pool to the bottom of the lowest commingled pool. All commingled well events will have a common GCI.

Enter the GCI for commingled wells only for the reporting well event. PETRINEX will populate the same value for the other well events with the "COMMIN" (i.e., commingled) status.

For wells with a previously approved MU order where production is allocated to each pool, the GCI will not be common. Each well event sequence will identify the open interval for the individual producing pools.

6.2.4 Drain Legs

4) When multiple well events are producing from the same pool, there must be an active event to which production is reported. Other events are assigned a "DRAIN" status and each leg must have a GCI value equivalent to the open completed interval within that leg.

Appendix 1 Clarification Related to Well Drilling, Completion, and Directional Survey Data

Drilling Operations

Re-entry operations
(for abandoned wells being re-entered by a new licensee)

An abandoned well licensed to another company is re-entered by a different company. An application for a well licence is required to be filed and approved by the Applications Branch before the re-entry operations begin (see *Directive 056: Energy Development Applications and Schedules*).

Common directional drill events: Must be recorded from all previous wellbores.

Finished drill date: The date re-entry operations are completed.

Historical casings: Must be recorded. Date, grade, density, and cement details are optional.

Packing devices or plugs: If drilled out and original perforations are exposed, the perforations must be recorded in the completion record as of the date the packing device or plug was drilled out.

Rig release date: The date the contractor is released from the well site.

Spud date: The date that re-entry operations start.

Total depth: Must be the original total depth of the well, even if all of the abandonment plugs are not drilled out. If it is deepened during re-entry operations, it is the new deeper depth.

Unique well identifier: A new unique well identifier is issued through the application for a new licence or approval process.

Well status: The status of the original well will be changed to "Abandoned and Re-entered" after receiving the electronic drilling data for the re-entered well.

Resumption operations
(for open or abandoned wells being re-entered by the licensee of the well)

If an abandoned or open (i.e., nonabandoned) well licensed to the same company is being re-entered for the purpose of deepening, whipstocking, recompletion, or horizontal recompletion, licensees must file an application for approval to resume drilling (see *Directive 056: Energy Development Applications and Schedules*).

If resuming drilling operations within six months of the spud date and the terminating formation and type of drilling operation (vertical, directional, or horizontal) are the same as originally licensed, application and approval to resume drilling is not required.

Once approved, the ERCB creates a new event sequence (other than /0) if

- it is the same licensee resuming drilling,
- the licensee is drilling to a new terminating formation,
- the drilling operation type changes (vertical, slant, directional, or horizontal),
- there is a change in regulations, or
- there is a change in the well category and type.

If the original well that was abandoned, is being re-entered by the same company, the status of the original well will change to "Abandoned and Re-entered" once the electronic drilling data for the well on which drilling operations are being resumed is received.

For wells on which drilling has resumed and a new event sequence has been assigned, enter the date operations were resumed. For continuing drilling operations on wells that have had surface casing preset or for wells being deepened without penetrating a new pool, do not resubmit the spud date.

Finished drill date: The date resumption operations are completed.

Rig release date: The date the contractor is released from the well site.

Historical casings: Must be recorded. Date, grade, density, and cement details are optional.

Common directional drill events: Must be recorded from all previous wellbores.

Packing devices or plugs: If drilled out and original perforations are exposed, perforations must be recorded in the completion record the date the packing device or plug was drilled out.

If an open well is being re-entered or resumed and subsequently abandoned in order to whipstock, licensees must electronically submit the abandonment details for the event sequence being abandoned and the drilling details for the new event sequence drilled. Once received, the status of the abandoned event sequence will change to "Abandoned and Whipstocked (ABWHP)."

If re-entering or resuming an open well, any additional legs that are drilled and produced from the same pool must be given an initial status of "DRAIN."

Reabandonments

If a cement plug in a previously abandoned well is drilled out and a new cement plug set, submit the new plug details in the plug back record and indicate the method as "rerun plug."

If casing is run to control a vent flow, enter the casing details in the casing record.

If the well is perforated and remedial cementing done to control a vent flow, enter the details in the completion record.

If the new abandonment plug has to be monitored, the status and status date of the well do not change.

Preset Surface Casing

Presetting surface casing is when surface casing has been preset and the drilling operations have not been completed to the licensed total depth within the initial drilling operation.

Ghost holes

A ghost hole is an uncased section of well that cannot be re-entered for mechanical reasons or due to conditions within the formation and for which none of the following have been completed:

- cores,
- a directional survey,
- drillstem tests, and
- logs (electric wireline or mud logs)

Ghost holes are not considered events and do not require an event sequence. Licensees are not required to submit data for a ghost hole.

Non-Initial Well Statuses

ERCB updates non-initial well statuses after receiving drilling and completion data or upon enforcement of a board closure order.

Abandoned (ABAN)

For a well that has been drilled and had some other well operation performed (i.e., production, injection, testing) and then subsequently abandoned downhole and at surface.

The ERCB updates the well status to "Abandoned" after it receives downhole abandonment and surface abandonment data.

For re-abandonments, the ERCB does not update the original "Abandoned" well status date.

Abandoned and Re-entered (ABRENT)

For a well that has been abandoned (downhole and surface) and re-entered on a re-entry licence or a resumption application.

The ERCB updates the well status of the abandoned well from "Abandoned" to "Abandoned and re-entered" after it receives drilling data on the new well event sequence. The status date of the abandoned well remains the same.

Abandoned zone (ABZONE)

For a well or portion of a well that has been drilled, has completed intervals, and subsequently abandoned downhole.

The ERCB updates the well status to "Abandoned zone," after a plug has been received, either under "Plugback" or "Completion," with the appropriate abandonment code and a log tag code.

Closed	For a well that has been shut in or closed by an ERCB Order resulting in the company not being able to operate the well. The date of this status is the date of the enforcement order. When the shut-in or closure order is rescinded or withdrawn, the ERCB updates the well with the status it had prior to the closure order.

Abandonment Statuses

Well abandonment	For a well that has been drilled and subsequently had downhole and surface abandonment completed. When the well is abandoned, submit both downhole and surface abandonment details. When both records are received, the ERCB will update the status of the well event to "Abandoned."
Zonal abandonment	For the abandonment of a single-pool completion within a cased-hole or the downhole abandonment of an open-hole interval in a cased hole. Submit the abandonment device (packing device, bridge plugs) together with the abandonment code and the log tag code. Once received, the ERCB will update the status of the well event to "Abandoned zone." When the abandonment device (packing device, bridge plug) is used to abandon multiple pools belonging to multiple well events, note the following: • If there are no open intervals above the plug, the "Abandoned zone" status is applied to all well events below the plug. There is no need to submit an amendment to the ERCB to change the well status to "Abandoned zone." • If there are open intervals above the plug, submit the data related to the abandonment device (packing device, bridge plug) on the well event being abandoned. Submit an amendment if the same plug is used to abandon other well events for the ERCB to change the well statuses to "Abandoned zone."
Downhole abandonment	This is the complete downhole abandonment of all pools and legs associated with the well.
Surface abandonment	The cutting off of casing string(s) and the permanent capping of a well.

Casing and Cementing *(See requirements 7 and 8 under Section 3.2)*

Production tubing	A casing record is not required for uncemented production tubing.
Tie-back casing	Tie-back casing is not required to be submitted.

Tapered casing	Tapered casing is more than one size of casing run in on the same casing string entirely cemented in one operation. Record each casing size as a separate string with the shoe set depth being the base of the particular casing size length. Record the cementing details on the deepest string.
Slotted liner run on bottom of cemented section of casing	If the liner and casing have the same outside diameter, report a casing entry for both the casing section and liner section of the string. If the liner and casing have different outside diameters, record a regular casing entry with the shoe set depth equal to the stage tool depth. Report the cement details. For the slotted uncemented portion, report a second casing entry with the shoe set depth equal to the depth of the slotted liner shoe and a liner top depth equal to the top of the liner. Report the cement entry as slotted uncemented liner. When a slotted liner is run in a well, in addition to reporting it in the casing record, you must also report it in the completion record showing the interval of the well covered by the slotted liner (from the shoe set depth of the previous casing to the shoe set depth of the liner). If the slotted liner is not run all the way to total depth, the open hole interval must also be recorded from the shoe set depth of the liner to total depth.
Open hole	If after running casing, the casing shoe is drilled out, leaving an open hole, the open hole interval must be reported in the completion record, showing the open hole from the shoe set depth of the last casing run to total depth of the well.
Casing (uncemented) in open hole intervals	If a section of casing is run in an open hole interval with no overlap to other casing strings, production is possible from behind it. Submit it under "Liner" (see Table 2, code 5) and "Uncemented casing" (see Table 3, code 92).
Casing/liner for multistage fracture	When submitting the operation type "Multistage fracture," see Appendix 4 for examples. Under the drilling details, report a casing record for either production casing or liner in addition to a cementing record. Report the cement detail as uncemented casing if uncemented. If the casing or liner includes a combination of cemented and uncemented sections, enter cementing details for all sections with the appropriate intervals. If the casing or liner is not run to total depth, enter the operation type code for "Openhole/barefoot completion" (see Table 12, code 8) from the casing or liner shoe to total depth.
Scavenger cements	Do not record scavenger cements.

Plug Backs/Abandonment Purpose Codes *(See requirement 12 under Section 3.2)*

Abandon	A cement plug or series of cement plugs is run in the hole for the purpose of abandonment during a drilling operation.
Abandon zone	A cement plug or series of cement plugs is run in the hole for the purpose of abandoning a pool.
Lost circulation plug (not drilled out)	A cement plug is run over the lost circulation interval to stop the drilling fluid from leaking into the formation.
Plug back and case	A cement plug is run before or after a casing has been set in the hole.
Plug back and whipstock	A cement plug is run and used to achieve the angle for directional or horizontal drilling from the original wellbore.
Plug back and sidetrack (fish)	A portion of the drill string or tools (fish) is stuck downhole and cannot be recovered. A cement plug is run over the fish. A new hole is then drilled around the fish to resume drilling operations.
Plug back and straighten	Drilling operations have deviated off target from the intended direction. A cement plug is run in a portion of the drilled hole and drilling operations continue at the correct deviation.

Operation Incidents (includes drilling, completion, and servicing operations) *(See requirement 13 under Section 3.2)*

Blowouts	A blowout is an unintended flow of wellbore fluids (oil, gas, water, or other substance) at surface that cannot be controlled by existing wellhead and/or blowout prevention equipment or a flow from one pool to another pool(s) (underground blowout) that cannot be controlled by increasing the fluid density. Control can only be regained by installing additional and/or replacing existing wellhead and/or blowout prevention equipment to allow shut-in or permit the circulation of control fluids or by drilling a relief well. An incident is not considered a blowout if the flow of fluids (oil, gas, water, etc.) into the wellbore can be circulated out or bled off through the existing wellhead and/or blowout prevention equipment. (See the definition of a kick below.)
Kicks	A kick is any unexpected entry of water, gas, oil, or other formation fluid into a wellbore that is under control and can be circulated out.
Lost circulation	A loss of circulation occurs when drilling fluids flow from the wellbore into the formation.
No incidents encountered	If no incidents were encountered during the operation, a well incident record must be submitted to show that no incidents were encountered.

Operation Type Codes *(See requirement 14 under Section 3.2)*

Acid treatment	A volume of acid circulated down a wellbore over or into a completed interval.
Alcohol squeeze	Alcohol injected into the formation to clean out deposits that have collected in the formation.
Casing patch	A mechanical apparatus used to seal leaking casing, isolate perforations or to cover leaking cement squeezed perforations. Can be submitted with a cement squeeze over the same interval.
Casing vent production	A surface casing vent that contributes to production.
Cement plug	A volume of cement placed in the casing to abandon a well or isolate a completion interval (i.e., abandon a pool).
Cement squeeze	Cement squeezed into a completed interval to seal it off or facilitate a casing repair.
Chemical squeeze	Chemicals injected into the formation to clean out deposits that have collected in the formation.
Fracture	Rocks split by applying pressure to the formation via the wellbore.
Hydrajet perforation	A perforation using fluid containing abrasive material. Shots per metre are not required. Also use this code to submit water-jetted slots that are used to perforate the formation significant distances from the wellbore. Include intervals in the GCI.
Multistage fracture	A system of fracture ports on a liner separated by external casing packers (see Appendix 4). Include intervals in the GCI. If an open hole exists between the liner shoe and total depth, record the GCI from the top of the shallowest open port to total depth.
Multistage fracture—port closed	A previously open fracture or blast port that has been closed.
Open hole/barefoot completion	An open hole/barefoot completion allows reservoir fluids to flow unrestricted (no casing) into the wellbore. This is a common completion for a horizontal well. If casing and associated cement is milled out through a full 360° use this code to represent the milled interval and record the completion date as when the milling operation was completed. Include intervals in the GCI. Note that multiple open hole records in a drilling leg can be submitted.
Packing device capped with cement	A mechanical device that is set (e.g., bridge plug, cement retainer) and then capped with cement.
Packing device capped with resin/gypsum cement	A mechanical device that is set (e.g., bridge plug, cement retainer) and then capped with resin-based low permeability gypsum cement.

Packing device, no cement	A packing device (e.g., whipstock packer, bridge plug) is set with no cement on top to abandon a pool. ERCB approval may be required prior to performing this operation.
Perforation	Holes made through the casing and cement into a formation using a perforating gun or pneumatic drill in order to expose the formation. Include intervals in the GCI. Also use this code for radially drilled slots. Do not include water-jetted slots.
Remedial Casing Cementing	Usually performed after perforating a casing in order to remedy casing cementing issues. A perforated interval is not included in the GCI.
Slotted liner	Mostly used as a completion in horizontal or directional wells. Requires a casing record and an associated completion record. Include intervals in the GCI. Note that multiple slotted liner records in a drilling leg can be submitted.

Packer codes *(See requirement 15 under Section 3.2)*

Packer	A device used to isolate the annulus from production tubing in the wellbore to allow separate production, injection, or treatment.

Additional Definitions

Maximum True Vertical Depth (max TVD) *(See page 26)*	The deepest vertical depth reached by the wellbore. The max TVD is populated by the ERCB from the directional survey report.
Total Depth	The maximum measured depth reached when drilling the wellbore.

Directional Survey Reports *(See Section 4)*

Use the following mapping parameters to configure GIS software.

Parameters

NAD83 Datum

Spheroid: GRS 1980
Semi-major axis: 6 378 137 metres
Semi-minor axis: 6 356 752.314
Inverse Flattening: 298.25722210100002

UTM Zones

NAD 1983 UTM Zone 11N:

Projection: Transverse Mercator
False Easting: 500 000.000
False Northing: 0.000
Central Meridian: -117.00000000
Scale Factor: 0.999600

Latitude of Origin: 0.00000000
Linear Unit: metres
Datum: NAD 83

NAD 1983 UTM Zone 12N:
Projection: Transverse Mercator
False Easting: 500 000.000
False Northing: 0.000
Central Meridian: -111.00000000
Scale Factor: 0.999600
Latitude of Origin: 0.00000000
Linear Unit: metres
Datum: NAD 83

Gross Completion Intervals—ERCB Review Process *(See Section 5)*

Status

Pending

If the GCI value submitted to PETRINEX requires confirmation due to the presence of either an abandonment or an isolation device, the GCI status is set to 'PENDING'. The ERCB will review all GCI values with this status.

Review

After reviewing a GCI value with a 'PENDING' status, the ERCB will set the status to 'REVIEW' if further review by the well licensee is deemed necessary. Otherwise, the GCI will be accepted and confirmed. The ERCB may indicate reasons for setting the GCI status to 'REVIEW' under an accompanying comments section.

If PETRINEX receives a new Completion record that indicates an open interval, the GCI status of the well event will automatically be set to 'REVIEW.' This includes the following operation type codes:

- 2—Perforation
- 5—Hydrajet perforation
- 7—Slotted liner
- 8—Open hole/barefoot completion
- 9—Casing vent production
- 42—Multistage fracture

If PETRINEX receives a new Completion record that indicates that a previously open interval is now closed but that the well event may still be producing or injecting from the same pool, the GCI status for the well event will automatically be set to 'REVIEW.' This includes the following operation type codes:

- 43—Multistage fracture (port closed)
- 51—Cement plug
- 52—Cement squeeze
- 53—Packing device capped with cement
- 57—Packing device capped with resin-gypsum cement

If PETRINEX receives a Packer record where the operation is either 'Set' or 'Pull', the GCI status for the well event will automatically be set to 'REVIEW.'

Wells that have had the GCI status set to 'REVIEW' can be listed in the report entitled "Wells with GCI Status 'REVIEW.' The report is generated by PETRINEX on a monthly basis but can also be created at any time by the well licensee.

Errors

If submitting a GCI to PETRINEX, an error will result if

- a well status is active and GCI values have not been submitted,
- the GCI interval includes a missing completion record (i.e., the completion submission has not flowed to PETRINEX),
- the GCI Top is deeper than the GCI Base or vice versa, or
- the GCI interval does not align exactly with the completion record that indicates an open interval (perforations, open-hole completions, slotted liners, or multistage fractures).

Appendix 2 Unique Well Identifiers

General Description

The unique well identifier (UWI) is the standard well identification that was developed for the petroleum industry by the Geoscience Data Committee of the Canadian Petroleum Association (CPA) and has been adopted by the oil and gas regulatory agencies of the four western provinces and federal areas. It consists of 16 characters, which make up four basic components:

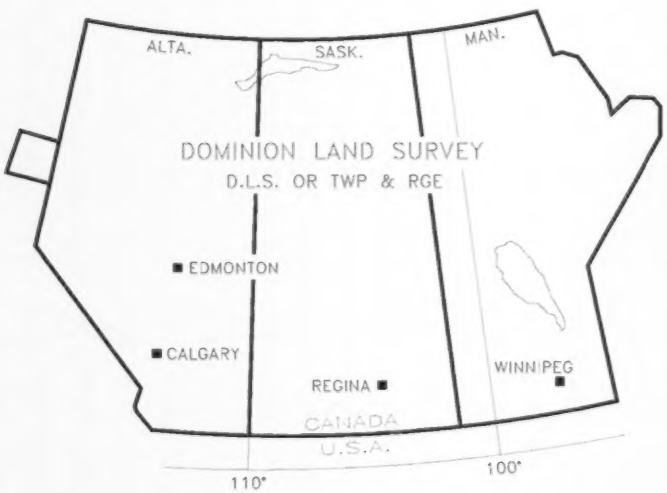
1) legal survey location
2) survey system code
3) location exception code
4) event sequence code

Together these define the approximate geographical location of the bottom of a drill hole and a specific drilling or producing event at the drill hole.

The unique well identifier, although based on the legal survey position of a well, is primarily for identification rather than location. The location component describes the bottomhole location of the well, not the surface position of the well.

Dominion Land Survey System

The legal survey location component for Alberta is the Dominion Land Survey (DLS) system, which is used in Alberta, Saskatchewan, Manitoba, and a portion of British Columbia.



Unique Well Identifier Format

The correct unique well identifier format is the 16-character format shown below:

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

The DLS system is designated in the unique well identifier format by a 1 in the first position.

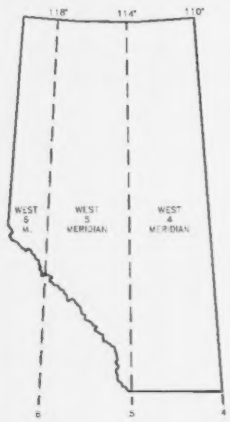
SS	LE		LSD		SC		TWP			RG		W	M	P	ES
1															

Acceptable value(s): 1 for Alberta
Abbreviation: S or SS

Meridian

For the purposes of survey locations, the province of Alberta is subdivided into three areas defined by the **meridians** of longitude.

For unique well identifier purposes, these are referred to as west (W) of the fourth, fifth, and sixth meridians.



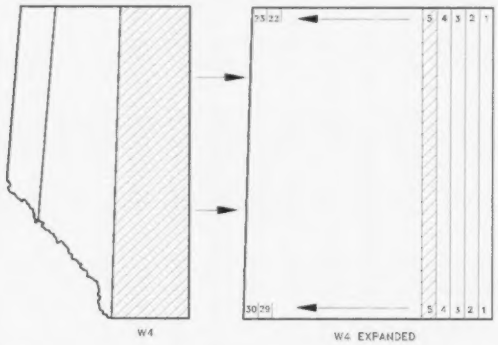
Example:

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
1												W	4		

Acceptable values: W4, W5, W6

Range

Each area (i.e., West 4, West 5, and West 6) subdivides into ranges, as shown below:



Example:

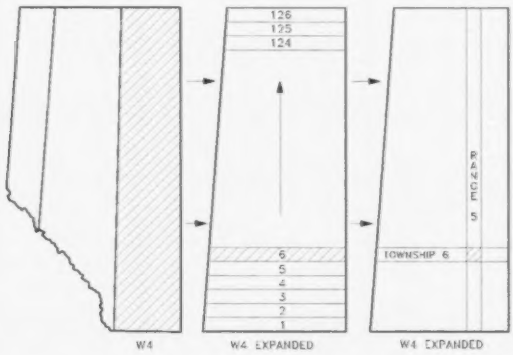
SS	LE		LSD		SC		TWP			RG		W	M	P	ES
1										0	5	W	4		

Acceptable values: Ranges are numbered from 1 to 30. Note that West of the sixth meridian contains a maximum of 14 ranges only.

Approximate size: A range measures 9.7 km (6 miles) east to west.

Township

Each area west of a meridian subdivides north-south into townships, as shown below:



Example:

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
1							0	0	6	0	5	W	4		

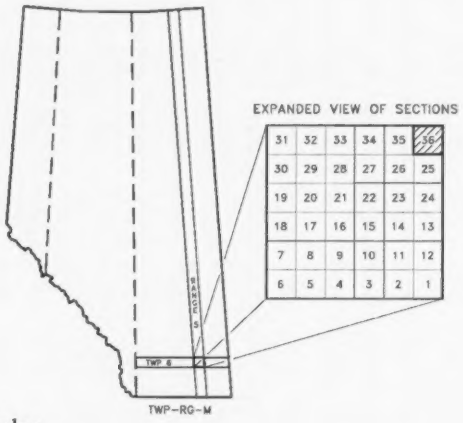
Acceptable values: Townships are numbered 001–126.

Approximate size: A township measures 9.7 km (6 miles) north to south.

Abbreviation: TWP

Section

After township, range, and meridian have been located for a drill hole, the next portion of the DLS is the section.



Example:

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
1					3	6	0	0	6	0	5	W	4		

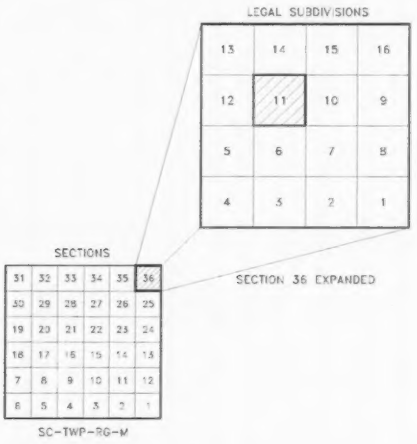
Acceptable values: Sections are numbered 1–36.

Approximate size: A section measures 1.609 by 1.609 km (1 mile by 1 mile).

Abbreviations: SEC or SC

Legal Subdivision

The smallest division in the DLS system is the legal subdivision.



Example:

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
1			1	1	3	6	0	0	6	0	5	W	4		

Acceptable values: Legal subdivisions are numbered from 1 to 16.

Approximate size: A legal subdivision measures 402 by 402 metres (1320 by 1320 feet).

Abbreviation: LS or LSD

Location Exception Code

The location exception code is used to identify cases where there is more than one well licensed on the smallest land area described by the DLS system. That is, the location exception code is used to describe more than one licensed well in a legal subdivision.

Example:

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
1	0	2	1	1	3	6	0	0	6	0	5	W	4		

This example illustrates the second licensed well in LSD 11-36-006-05W4.

Acceptable values: Local exception codes are numbered 00, 02–99.

Exceptions: 01 is not used.

Abbreviation: LE

In addition, the location exception is generally used to describe the sequence in which the drill holes were licensed in the legal subdivision.

Event Sequence Code

The event sequence code is a one-character code indicating the chronological sequence of a significant drilling and/or completion operation of a drill hole that yields a separate and unique set of geological or production data.

Example:

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
1	0	2	1	1	3	6	0	0	6	0	5	W	4		2

This example illustrates a second event sequence in the second drill hole in LSD 02/11-36-006-05W4/2.

Acceptable values: 0, 2–9

Exceptions: 1 is not used.

Abbreviation: ES

Padding Character

This is an unused character in the unique well identifier format and is left blank. This position is required in other survey systems.

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
1	0	2	1	1	3	6	0	0	6	0	5	W	4		2

Abbreviation: P

Application to Resource Areas

The following section explains the exact usage of the unique well identifier as it applies to the oil and gas and oil sands areas.

Oil and Gas Areas

The first well licensed in an LSD is indicated as

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
	0	0													

The second well licensed in an LSD is indicated as

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
	0	2													

The thirteenth well licensed in an LSD is indicated as

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
	1	3													

Acceptable values: 00, 02–99

Exceptions: 01 is not used.

Oil Sands Resource Area

The oil sands resource area employs the same components of the unique well identifier as the oil and gas identifiers. However, the location exception portion of the unique well identifier has different code designations.

Oil Sands Location Exception Codes

The following location exception designations are used for oil sands evaluation (OV) drill holes.

Example:

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
	A	A													

Acceptable values: AA through HZ, with the sequence AA, AB, AC… AZ, BA, BB, BC… HW, HX, HY, HZ

Exceptions: The use of I or O is not acceptable (e.g., BI, BO, GI, GO, etc., are not acceptable).

The location exception codes for OV wells may not always be assigned in the chronological order of licensing. For example, the first OV well licensed in an LSD may have a location exception code other than AA.

An oil sands evaluation drill hole that bottom holes in a road allowance will be assigned a road allowance location exception code as it outranks an oil sands location exception code.

Multiple Resource Occurrences

If more than one resource is encountered by a drill hole, identify each resource with the appropriate location exception code of the unique well identifier.

Using the first well licensed in an LSD as an example, identify a conventional oil and gas resource as:

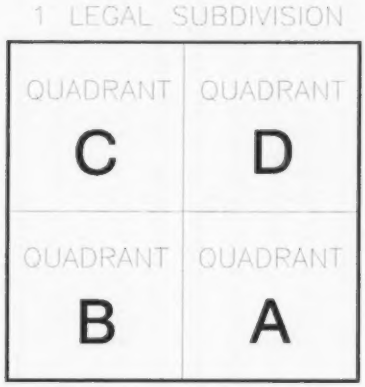
SS	LE		LSD		SC		TWP			RG		W	M	P	ES
1	0	0	1	0	2	0	0	3	0	1	5	W	4		0

For the same well, identify an oil sands resource as:

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
1	A	A	1	0	2	0	0	3	0	1	5	W	4		2

Quadrants

Quadrants only exist for historical wells and are no longer assigned as part of new UWIs. Previously, if a drilling spacing unit (DSU) was less than 16 hectares (40 acres) or one LSD, quadrants within an LSD were designated, as follows:



Example:

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
	A														

Acceptable values: A, B, C, D

Approximate size: One quadrant measures 201 by 201 metres.

The second digit of the location exception code indicates the chronological sequence in which the wells were drilled in the quadrant.

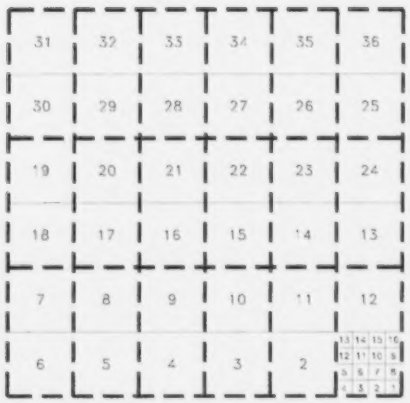
For example, indicate the first well drilled in Quadrant A as follows:

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
	A	0													

Acceptable values: 0, 2–9

Exceptions: 1 is not used.

Road Allowances



The darkened lines above indicate road allowances. A well that terminates (i.e., TD) in a road allowance is referenced either south (S) or west (W) of the legal subdivision indicated in the unique well identifier.

For example, assign a local exception code of south (S) for a well terminating in the SW section of the road allowance of a legal subdivision.

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
	S														

Acceptable values: S or W

Approximate size: A road allowance is 20 or 30 metres wide.

The second digit of the location exception code indicates the logical sequence in which the wells were licensed in the road allowance.

For example, indicate the first well in a road allowance as follows:

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
	S	0													

Acceptable values: 0, 2–9

Exceptions: 1 is not used.

Water Sources

A unique well identifier's location exception code is also used to designate locations from which source water is produced for wells >150 m deep.

Use (F) for freshwater wells and (O) for other.

Example:

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
	F														

Acceptable values: F, O

Use the second digit of the location exception code to indicate the sequence, in chronological order, in which the water source locations were used.

For example, indicate the first water source well as follows:

SS	LE		LSD		SC		TWP			RG		W	M	P	ES
	F	1													

Acceptable values: 1, 2–9

Exceptions: 0 is not used.

Examples of Unique Well Identifiers

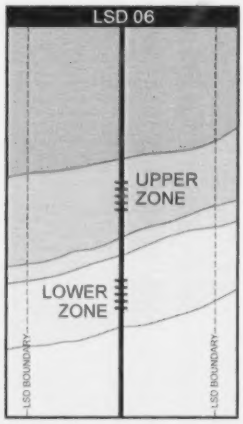
1) Multiple completions

An initial completion retains the originally assigned unique well identifier with the zero event sequence (e.g., 00/06-12-045-12W4/0).

Subsequent completions are assigned the next event sequence (e.g., 00/06-12-045-12W4/2).

If a well is completed in two or more commingled pools (SD and DE), all pools may be assigned to one event sequence (e.g., 00/06-12-045-12W4/0).

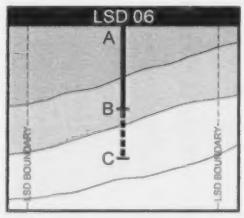
Event sequence codes are assigned chronologically. However, if both pools are completed in the same operation, the lower pool is deemed to be completed first.



2) Deepening of an existing well to a new geological horizon

An existing well, A to B, has a unique well identifier of 00/06-14-045-12W4/0.

The deepened portion of the well, A to C, is assigned a new unique well identifier of 00/06-14-045-12W4/2.

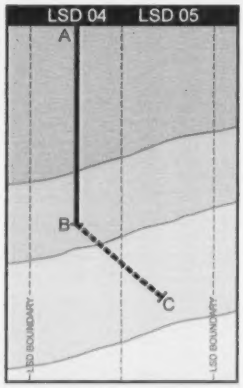


3) Deepening of an existing well to a new geological horizon by whipstocking

Existing well, A-B, has a unique well identifier of 00/04-14-045-12W4/0.

When the deepened portion is projected to bottom in LSD 05 or inadvertently bottoms in LSD 5, the new hole from A to C is assigned a new unique well identifier of 00/05-14-045-12W4/2.

It is given an event sequence of 2 to indicate that the new borehole originated from an existing well.

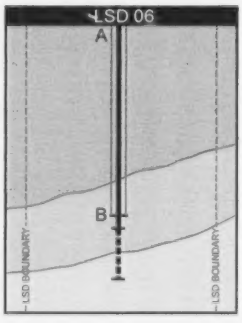


4) Re-entry of an existing abandoned well

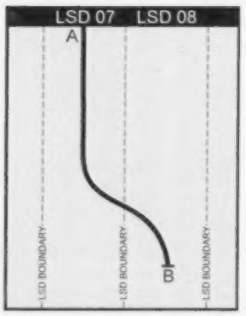
This case applies when the abandonment plugs are drilled out.

An existing abandoned well, A to B, has a unique well identifier of 00/06-17-045-12W4/0.

Re-entry data are assigned a new unique well identifier of 00/06-17-045-12W4/2.



5) Directionally drilled well projected to bottom in a specified legal location

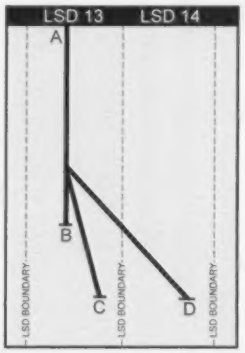


At the time of licensing, the well is assigned its projected location.

When projected to LSD 08, it is assigned a unique well identifier of 00/08-18-045-12W4/0.

When projected to LSD 07 but inadvertently bottomed in LSD 08, the unique well identifier at time of licensing would be 00/07-18-045-12W4/0 and would subsequently be changed to 00/08-18-045-12W4/0.

6) Whipstocked hole from an existing well

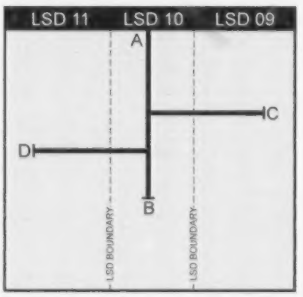


An existing well, A to B, has a unique well identifier of 00/13-20-045-12W4/0.

When the whipstocked hole is projected to bottom in LSD 13, it is assigned a unique well identifier of 00/13-20-045-12-W4/2. This identifier remains unchanged if it actually bottoms in LSD 13 (A to C).

If the whipstocked hole inadvertently bottoms in LSD 14 (A to D), it is assigned a new unique well identifier of 00/14-20-045-12W4/2.

7) Horizontal wells



An existing well, A to B, has a unique well identifier of 00/10-21-045-12W4/0.

Borehole A to C would have a unique well identifier of 00/09-21-045-12W4/2.

Borehole A to D would have a unique well identifier of 00/11-21-045-12W4/3.

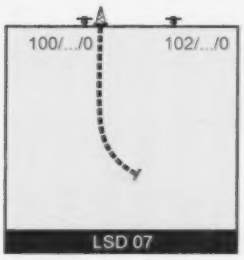
Each new borehole (A to C and A to D) is assigned an event sequence in the order that they were drilled.

8) Preset surface casing

A well that was preset with surface casing is always assigned the initial well event sequence /0 (e.g., 00/07-21-045-12W4/**0**).

After the well is drilled to licensed total depth, the event sequence remains the same (e.g., 00/07-21-045-12W4/**0**).

9) Cancelled well licence(s)

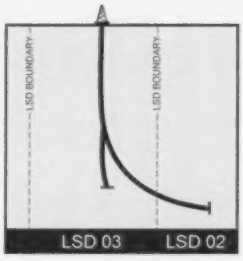


At the time of licensing, the local exception code of the unique well identifier is assigned based on the sequence that the wells were licensed.

In the example on the right, the unique well identifiers 00/07-21-045-12W4/0 and 02/07-21-045-12W4/0 were assigned to the first two licensed wells, but were never drilled. The third licensed well is assigned a unique well identifier of 03/07-21-045-12W4/0.

Unique well identifiers for cancelled well licenses are not re-assigned.

10) Horizontal leg drilled out of a vertical wellbore

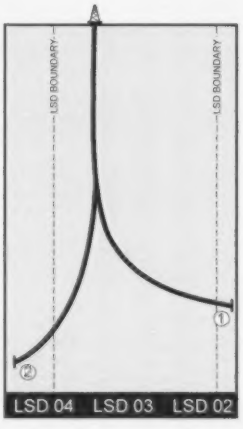


The unique well identifier is assigned based on the projected bottomhole location of the longest drill leg.

In the example on the right, the unique well identifier assigned at licensing is 00/02-15-054-06W4/0.

As there are two drilling legs, a unique well identifier of 00/02-15-054-06W4/2 is created during the drilling data submission. After receiving details on the directional survey, the ERCB will amend the unique well identifier for the vertical well event to 00/03-15-054-06W4/0.

11) The bottomhole location of a drilling leg in a different LSD



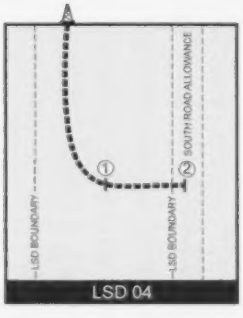
The unique well identifier is assigned based on the projected bottomhole location of the longest drilling leg.

In the example on the right, the unique well identifier assigned at licensing is 00/04-15-054-06W4/0.

As there are two drilling legs, a unique well identifier of 00/04-15-054-06W4/2 is created during the drilling data submission. After receiving details on the directional survey for both drilling legs, the ERCB will amend the unique well identifier of the first drilling leg to 00/02-15-054-06W4/0.

The details on the directional survey will confirm the bottomhole location for the second drilling leg as 00/04-15-054-06W4/2.

12) Oil sands, road allowances, and water source wells



Unique well identifiers use different local exception codes to designate conventional resources, oil sands, road allowances, and water source wells.

Using the example on the right, if drill hole (1) encounters a conventional oil and gas or coal bed methane or shale gas formation, a numeric value (00, 02 to 99) will be assigned to the local exception code.

The value "01" is not used (e.g., 00/04-08-070-03W4/0).

If drill hole (1) encounters an oil sands pool, an alpha character (AA to HZ) will be assigned to the local exception code. The characters "I" and "O" are not used (e.g., AA/04-08-070-03W4/0).

If drill hole (1) is located on a water source location, an alphanumeric character will be assigned to the local exception code, beginning with either an "F" for a freshwater well or an "O" for other (e.g., F1/04-08-070-03W4/0). The second digit of the local exception code represents the order in which the well was licensed. Zero (0) is not used.

If drill hole (2) is drilled and the bottomhole is in a road allowance, an alphanumeric character is assigned to the local exception code, beginning with either an "S" if south of the LSD or a "W" if west or southwest of the LSD (e.g., S0/04-08-070-03W4/0). The second character of the location exception code represents the order in which the well was licensed. One (1) is not acceptable.

Local exception codes for road allowances outrank code designations for water source wells and conventional and unconventional resources.

13) Re-entered wells

Re-entry operations are performed on an abandoned well by a different licensee. A new well licence is issued and the next available well event sequence is assigned at the time of licensing. For example, if the unique well identifier of the abandoned well is 00/09-11-065-04W4/0, a re-entry approval will generate a new licence which will be assigned a unique well identifier of 00/09-11-065-04W4/2.

Appendix 3 Minimum Data Submission Requirements for Daily Record of Operations

Well Data	Well name, location, contractor, rig number, kelly bushing elevation (KB), and surveyed ground elevation.
Tests	Details of all BOP and choke manifold pressure tests, test duration, and initial and final test pressures. Details of daily mechanical tests (including equipment tested). Air shut-off tests: details of any predrill-out and weekly shutdown of mechanical tests. BOP drills: details of all predrill-out and weekly drills, including mode of operation (drilling, tripping, or out of the hole), equipment used, and training requirements.
Drilling Information	Spud date, bit size, depth of hole at beginning or end of each tour, deviation surveys, whipstock-setting depths, directional surveys, fishing details, total depth, and rig release date.
Drilling Occurrences	Lost circulation: depth and interval, density and volume of fluid lost, amount and types of materials used. Water, gas, or oil kick: depths, shut-in and circulating pressures, influx volume, control procedures.
Formation Tests	Drillstem test: test number, interval, valve open time, gas, oil, or water to surface times and flow rates, recovered volumes, pressure data (chart and times). Wireline tests: test number, depth, duration, recovery pressure data and times. Flow tests: flow rates, depths, recoveries (BS&W, volumes, H_2S, API, salinities, and analysis), fluid levels. Swab tests: depths, recoveries, fluid levels.
Cores	Core number, interval, size, recovery, and analysis (where applicable). Sidewall cores: depths and analysis (where applicable).
Logs	All types of logs run and corresponding intervals, including cased-hole cement bond logs.
Abandonment or Plug Back	Plug number, interval, plug setting, amount of cement and additives, slurry weights, time and depth the plug is felt, drilled-out depth. Bridge plugs: setting depth, pressure test details, amount of cement in cap. Surface abandonment: details, including cutting of casing, cement cap, or welding on plate.

Casing and Liners

Size, setting depth, liner top, weight, grade, collar type, new or used (if mixed string is run, this information is required for each section).

Casing Cementing

Amount and type of cement and additives, slurry weight, slurry volume, returns to surface, cement top (if determined).

Completion

Packers: type, setting depth.

Perforations: interval, type, number; if notched, quantities of sand and fluid and treating pressure, dates and times.

Acidizing: interval, type, concentration, volume of acid and additives, wash or squeeze, feed rates, pressures, and dates and times.

Squeeze jobs: interval, amounts and types of materials squeezed, feed rates, pressures, and dates and times.

Fracturing:

Information to be submitted per fractured drilling event sequence, i.e., drilling UWI.

1) Fracture Configuration: through casing or with a liner.
2) Carrier Fluids:
   a) Water Types
   b) Source for all Water Types:
      - Latitude and longitude
      - DLS location
      - Major basin
      - Major subwatershed
      - Name of water body for surface water
      - Name of geologic zone for groundwater
      - Name of supplier for municipal water (e.g., town/city name) or nonoilfield wastewater (e.g., company and facility name).
   c) Administrative Information:
      - Water source diversion authorization type (e.g., *Water Act* licence, *Water Act* temporary diversion licence, water resources licence) and water source diversion authorization ID for all nonsaline water types.[1]
      - Water well ID number and ERCB UWI (if >150 m deep) for all groundwater types.

[1] Well licensees must ensure that use of nonsaline water for oil and gas operations complies with the *Water Act*, which requires appropriate authorization from Alberta Environment and Sustainable Resource Development (ESRD). Information on the process for obtaining authorization can be obtained from the ESRD website.

- ERCB reporting facility ID and DLS (optional) for oilfield produced water and wastewater types. If oilfield-produced water is nonsaline, also provide details of ESRD diversion authorization type and ID.
- DLS location and ERCB licence number for energy well providing recycled fracturing water.

d) Volumes and Quality:

- Start date and end date of diversion, average daily diversion rate (m^3/d), maximum diversion rate (m^3/d for groundwater, m^3/s for surface water), and total volume for each surface water and groundwater source
- Total volume for all other sources
- Total dissolved solids (TDS) content in milligrams per litre for all groundwater sources before any treatment occurs.

e) Non-Water Types:

- Volume (m^3)

3) Measurement of fracture extent and orientation (e.g., microseismic, tilt meter, etc.): if run, the report must be submitted.

4) Service company job reports (including treatment pressure charts)

Information to be provided per fracture stage.

1) Fracture Configuration

2) Service Provider

3) Carrier Fluid: type, volume

4) Propping Agents: types, quantity, and size.

5) Additive Information: type, name, supplier, purpose (e.g., plugging agents, cross linker, breaker, buffer, etc), including if designated as a trade secret.

6) Additive Ingredient Information: Chemical Abstract Service number (CAS #), ingredient concentration in additive (per cent by mass), and ingredient concentration in hydraulic fracturing carrier fluid (per cent by mass).

- For an additive or additive ingredient that is deemed a trade secret and is hazardous, licensees must indicate the chemical family name and provide a Hazardous Material Information Review Commission (HMIRC) designation number as an alternative to providing the CAS #.

- For an additive or additive ingredient that is deemed a trade secret and is nonhazardous, licensees must indicate that it is a trade secret and provide the chemical family name as an alternative to providing the CAS #.

7) Feed Rates: maximum treatment rate and average treatment rate.

8) Pressures: breakdown, maximum treating pressure, average treatment pressure, and instantaneous shut-in pressure, if determined.

Workover details

Artificial lift details, including pump type.

Appendix 4 Submission Examples

A) Directional Drill Event Submissions

1. Sidetrack fish example

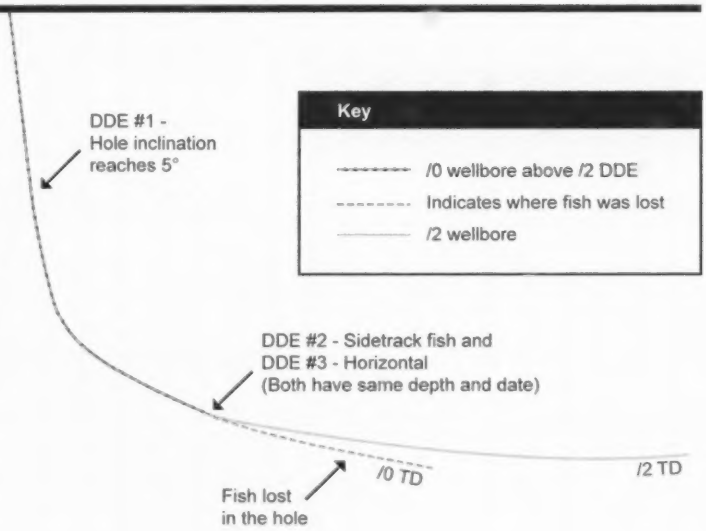
Submission details:
Submit DDE #1 for point where hole inclination reaches 5° (Deviate).

Subsequently, a fish is lost and the /0 has to be plugged back. (Note: this leg requires an event sequence).

/2 sidetracks above the cement plug abandoning the /0 event sequence. Submit this DDE as a "Sidetrack fish" DDE on the sidetrack event, not the event in which the fish was lost. If this sidetrack leg has been drilled horizontally, then submit a second DDE with the same depth and date as the Sidetrack fish DDE.

Example:
/0
DDE #1 = 20101205, 400.00 mKB, Deviate

/2
DDE #1 = 20101205, 400.00 mKB, Deviate
DDE #2 = 20101207, 1500.00 mKB, Sidetrack fish
DDE #3 = 20101207, 1500.00 mKB, Horizontal


Ground level
DDE #1 - Hole inclination reaches 5°
Key
/0 wellbore above /2 DDE
Indicates where fish was lost
/2 wellbore
DDE #2 - Sidetrack fish and DDE #3 - Horizontal (Both have same depth and date)
/0 TD
/2 TD
Fish lost in the hole

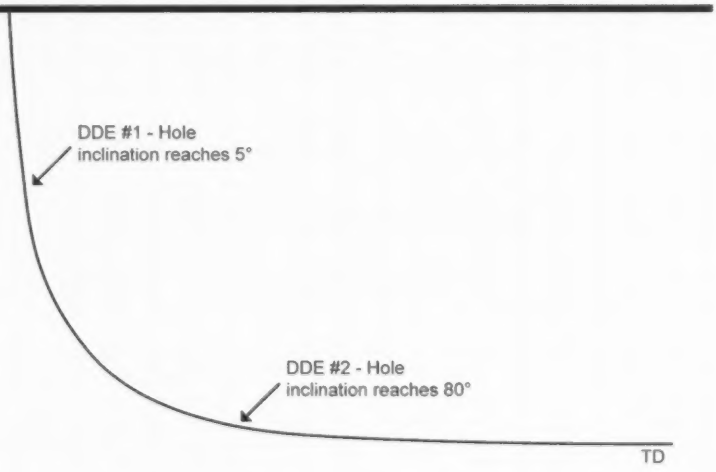
2. Single drilling event well

Submission details:
Submit DDE #1 for point where hole inclination reaches 5° (Deviate).

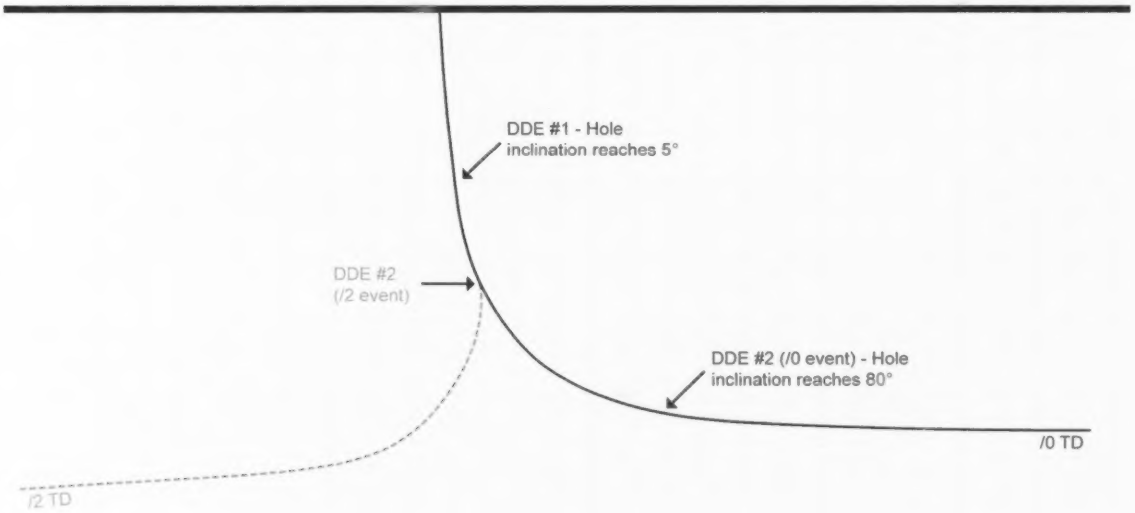
Submit DDE #2 for point where hole inclination reaches 80° (Horizontal).

Both DDEs **must** be submitted.

Example:
DDE #1 = 20101205, 400.00 mKB, Deviate
DDE #2 = 20101207, 1500.00 mKB, Horizontal



3. Well with two drilling events



Submission details:

For /0 submit DDE #1 for point where hole inclination reaches 5° (Deviate). Submit DDE #2 (/0 event) for point where hole inclination reaches 80° (Horizontal).

For /2, submit DDE #1 from the /0 event with same details because it is common to both events. Submit DDE #2 (/2 event) where /2 sidetracks from the /0 event. If the leg was drilled horizontally (i.e., inclination is >80°), give reason as Horizontal, otherwise the reason should be Deviate.

Example:

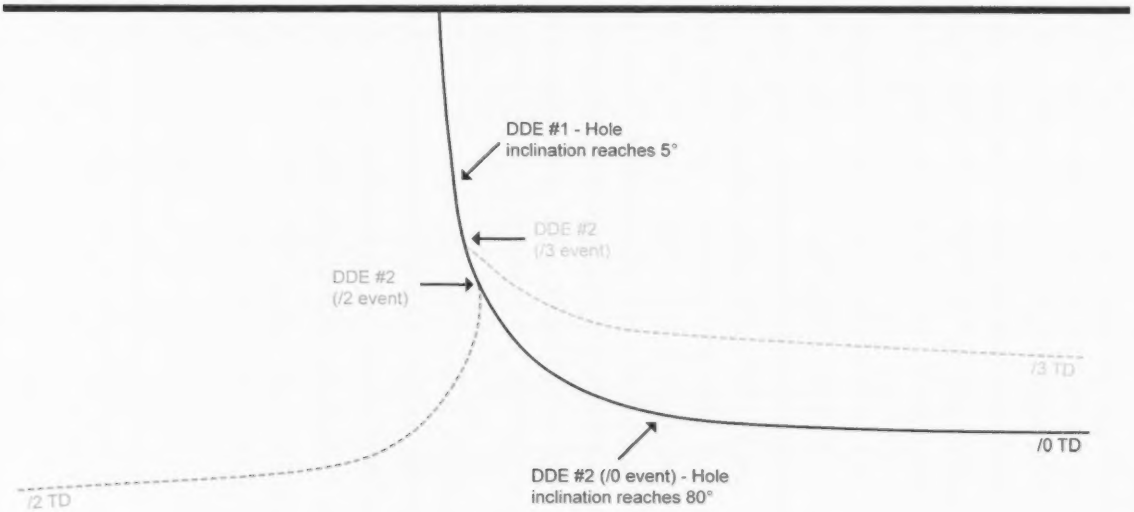
/0

DDE #1 = 20101205, 400.00 mKB, Deviate
DDE #2 = 20101207, 1500.00 mKB, Horizontal

/2

DDE #1 = Same as for the /0 event.
DDE #2 = 20101212, 900.00 mKB, Deviate (if inclination reached 5°) or Horizontal (if inclination reached 80°).

4. Well with three drilling events


Ground level
DDE #1 - Hole inclination reaches 5°
DDE #2 (/3 event)
DDE #2 (/2 event)
/3 TD
/0 TD
DDE #2 (/0 event) - Hole inclination reaches 80°
/2 TD

Submission details:

For /0, submit DDE #1 for point where hole inclination reaches 5° (Deviate). Submit DDE #2 for point where hole inclination reaches 80° (Horizontal).

For /2, submit DDE #1 from the /0 event with same details because it is common to both events. Submit DDE #2 (/2 event) where /2 sidetracks from the /0 event. If the leg was drilled horizontally (i.e. Incl >80°), give reason as Horizontal, otherwise the reason should be Deviate.

For /3, submit DDE #1 from the /0 event with same details because it is common to both events. Submit DDE #2 (/3 event) where /3 sidetracks from the /0 event. If the leg was drilled horizontally (i.e. Incl >80°) give reason as Horizontal, otherwise the reason should be Deviate.

Example:

/0
DDE #1 = 20101205, 400.00 mKB, Deviate.
DDE #2 = 20101207, 1500.00 mKB, Horizontal.

/2
DDE #1 = Same as for the /0 event.
DDE #2 = 20101212, 900.00 mKB, Deviate (if inclination reached 5°) or Horizontal (if inclination reached 80°).

/3
DDE #1 = Same as for the /0 event.
DDE #2 = 20101217, 700.00 mKB, Deviate (if inclination reached 5°) or Horizontal (if inclination reached 80°).

B) Mixed Casing Submissions

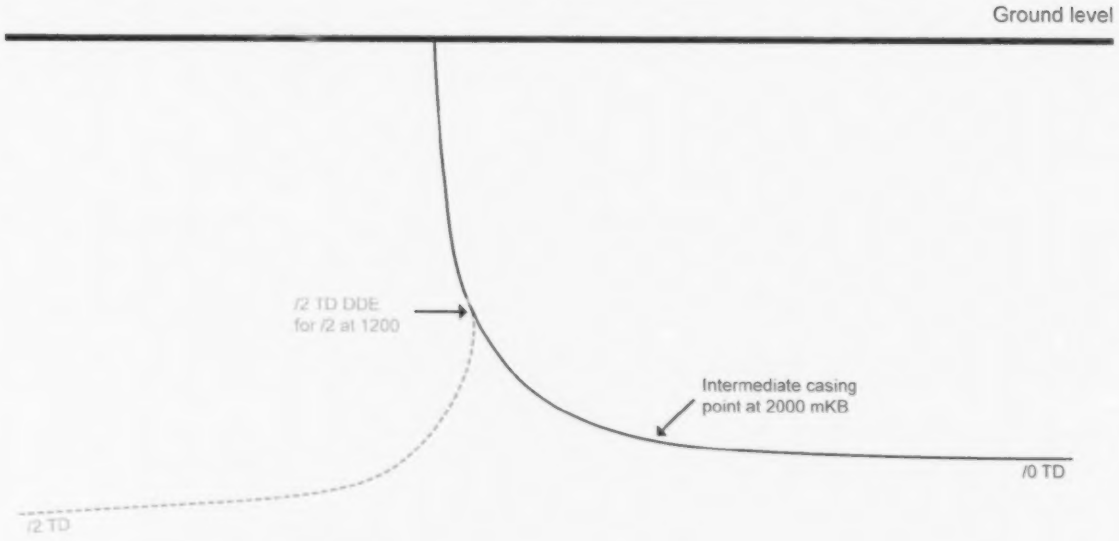
Observation No.	Date	Shoe Set Depth (mKB)	Liner Top Depth (mKB)	Casing Density (kg/m)	Grade Steel Process	Grade Yield Strength	Type	Outside Diameter (mm)
1	25 Jan 2011	264.00		29.8	H	40	Surface	177.8
2	No date	1500.00	N/A	17.3 Highest	J	55	Production	114.3 Largest
Casing information not submitted				14.1	L	80	Production	101.6
3	30 Jan 2011	3000.00	N/A	11.5 Lowest	P	110	Production	88.9 Smallest

If a mixed (i.e., more than one casing grade steel process, grade yield strength, density, or diameter) casing string is run, enter two casing records to represent the extremes of the grades, densities, and diameters.

In the example above, the production casing string has three different substrings. For data submission, the first production casing record (Observation No. 2) must include the highest density, the largest diameter, and the associated grade and have no date entered. The second production casing record (Observation No. 3) must include the lowest density, the smallest diameter, and the associated grade. For the upper substring record (Observation No. 2), the shoe set depth, which will depend on the casing string mix, can be anywhere along the entire casing string except the actual shoe depth. The lower substring record (Observation No. 3) must have a shoe set depth equal to the shoe of the casing string.

The cementing record for the entire casing string should be attached to the lower substring record. No cement record must be attached to the upper substring.

C) Copying Casing Record Where New Drill Leg Sidetracks Above Casing Shoe



Observation No.	Date	Shoe Set Depth (mKB)	Liner Top Depth (mKB)	Casing Density (kg/m)	Grade Steel Process	Grade Yield Strength	Type	Outside Diameter (mm)
/0 event								
1	25 Jan 2011	264.00	N/A	48.1	H	40	Surface	244.5
2	30 Jan 2011	2000.00	N/A	17.3	J	55	Intermediate	177.8
/2 event								
1	25 Jan 2011	264.00	N/A	48.1	H	40	Surface	244.5
2	No date	1200.00	N/A	17.3	J	55	Intermediate	177.8

After casing a leg, if a subsequent leg is drilled and sidetracks above the previous casing shoe (e.g., through a milled window in the casing) and is not cased (i.e., open hole) indicate the shoe of the casing for the sidetrack leg as the start of the sidetrack not the shoe of the previous casing, which is not applicable to the sidetrack leg.

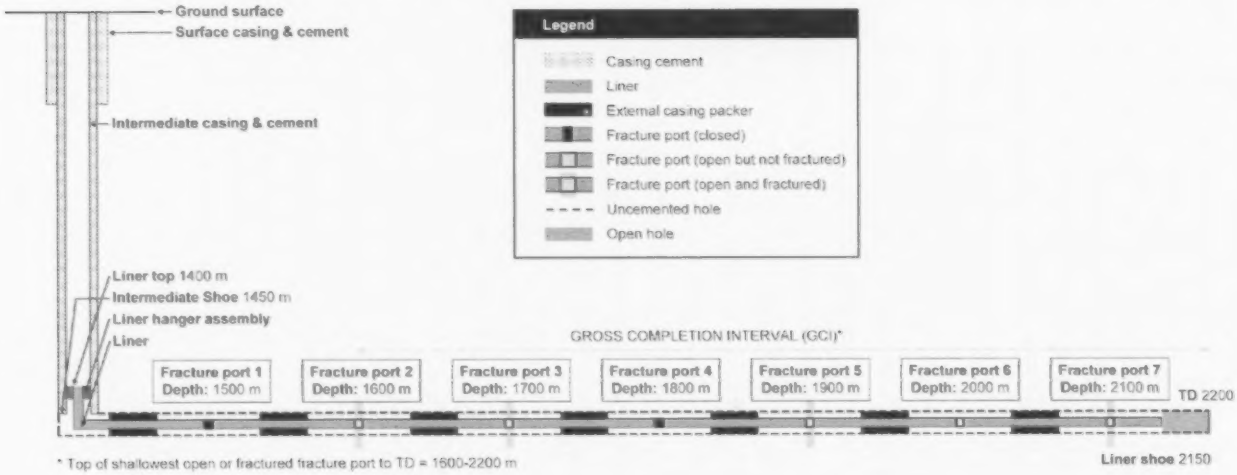
D) Multistage Fracture (MSF) Submissions

For each example submission, licensees must note the following:

- Submit open or open and fractured fracture or blast ports only.
- Submit an open hole/barefoot completion only if there is a gap between the liner shoe and TD.
- Unless both an interval top and interval base are available, the fracture or blast port interval is to be 0.1 m (e.g., 1500.0–1500.1 m).

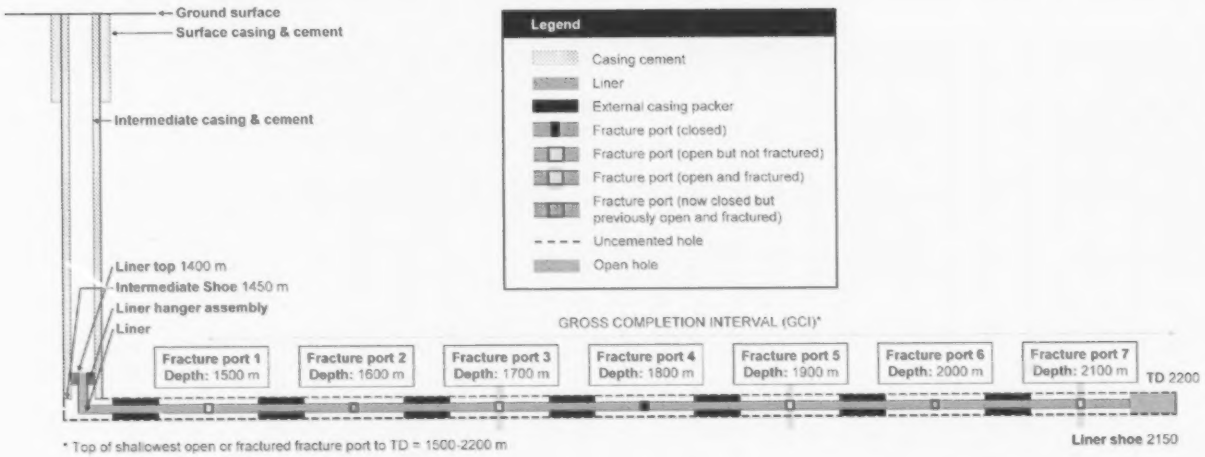
1) Fracture liner hung from intermediate casing

a) Initial completion


Ground surface
Surface casing & cement
Intermediate casing & cement
Liner top 1400 m
Intermediate Shoe 1450 m
Liner hanger assembly
Liner
Legend
Casing cement
Liner
External casing packer
Fracture port (closed)
Fracture port (open but not fractured)
Fracture port (open and fractured)
Uncemented hole
Open hole
GROSS COMPLETION INTERVAL (GCI)*
Fracture port 1 Depth: 1500 m
Fracture port 2 Depth: 1600 m
Fracture port 3 Depth: 1700 m
Fracture port 4 Depth: 1800 m
Fracture port 5 Depth: 1900 m
Fracture port 6 Depth: 2000 m
Fracture port 7 Depth: 2100 m
TD 2200
* Top of shallowest open or fractured fracture port to TD = 1600-2200 m
Liner shoe 2150

Initial completion (new submission)	Code	Interval (mKB) Top	Base
Drilling			
Liner	5	1400	2150
Liner cement	92	1400	2150
Completion			
Open hole	8	2150	2200
Fracture port 2	42	1600	1600.1
Fracture port 3	42	1700	1700.1
Fracture port 5	42	1900	1900.1
Fracture port 6	42	2000	2000.1
Fracture port 7	42	2100	2100.1

b) Subsequent completions

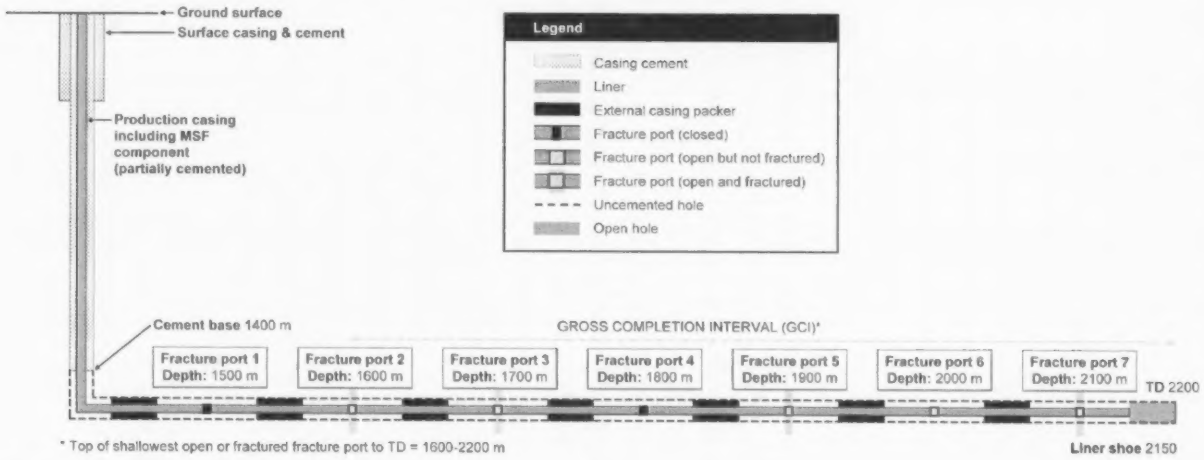

Ground surface
Surface casing & cement
Intermediate casing & cement
Liner top 1400 m
Intermediate Shoe 1450 m
Liner hanger assembly
Liner
Legend
Casing cement
Liner
External casing packer
Fracture port (closed)
Fracture port (open but not fractured)
Fracture port (open and fractured)
Fracture port (now closed but previously open and fractured)
Uncemented hole
Open hole
GROSS COMPLETION INTERVAL (GCI)*
Fracture port 1 Depth: 1500 m
Fracture port 2 Depth: 1600 m
Fracture port 3 Depth: 1700 m
Fracture port 4 Depth: 1800 m
Fracture port 5 Depth: 1900 m
Fracture port 6 Depth: 2000 m
Fracture port 7 Depth: 2100 m
TD 2200
* Top of shallowest open or fractured fracture port to TD = 1500-2200 m
Liner shoe 2150

	Code	Interval (mKB)	
		Top	Base
Initial completion (existing data)			
Drilling			
Liner	5	1400	2150
Liner cement	92	1400	2150
Completion			
Open hole	8	2150	2200
Fracture port 2	42	1600	1600.1
Fracture port 3	42	1700	1700.1
Fracture port 5	42	1900	1900.1
Fracture port 6	42	2000	2000.1
Fracture port 7	42	2100	2100.1
Subsequent completions (new submission)			
Fracture port 1[a]	42	1500	1500.1
MSF-port closed[b]	43	1600	1600.1
MSF-port closed[c]	43	2000	2000.1

[a] Previously closed, this port has been opened but is not fractured.
[b] Previously open and fractured, fracture port 2 has been closed.
[c] Previously open and fractured, fracture port 6 has been closed.

2) Fracture liner

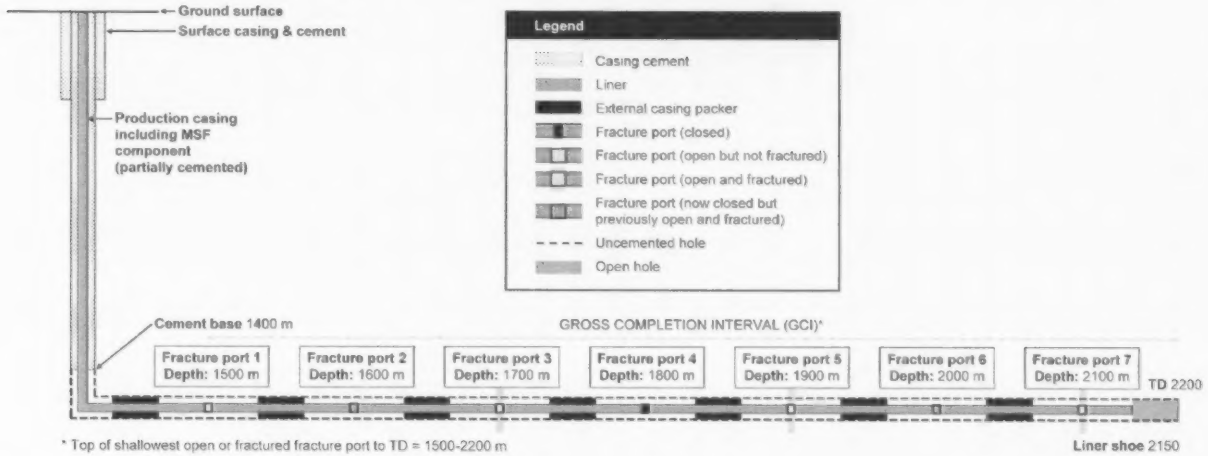
a) Is part of production casing run to surface (initial completion)


Ground surface
Surface casing & cement
Production casing including MSF component (partially cemented)
Legend
Casing cement
Liner
External casing packer
Fracture port (closed)
Fracture port (open but not fractured)
Fracture port (open and fractured)
Uncemented hole
Open hole
Cement base 1400 m
GROSS COMPLETION INTERVAL (GCI)*
Fracture port 1 Depth: 1500 m
Fracture port 2 Depth: 1600 m
Fracture port 3 Depth: 1700 m
Fracture port 4 Depth: 1800 m
Fracture port 5 Depth: 1900 m
Fracture port 6 Depth: 2000 m
Fracture port 7 Depth: 2100 m
TD 2200
* Top of shallowest open or fractured fracture port to TD = 1600-2200 m
Liner shoe 2150

Initial completion (new submission)	Code	Interval (mKB) Top	Base
Drilling			
Production casing	4		2150[a]
Production casing cement	-	0	1400
Production casing cement	92	1400	2150
Completion			
Open hole	8	2150	2200
Fracture port 2	42	1600	1600.1
Fracture port 3	42	1700	1700.1
Fracture port 5	42	1900	1900.1
Fracture port 6	42	2000	2000.1
Fracture port 7	42	2100	2100.1

[*] If casing is cemented, use the appropriate code from *Directive 059*. See requirement 8 (Cementing).
[a] Shoe of liner.

b) Is part of production casing run to surface (subsequent completions)

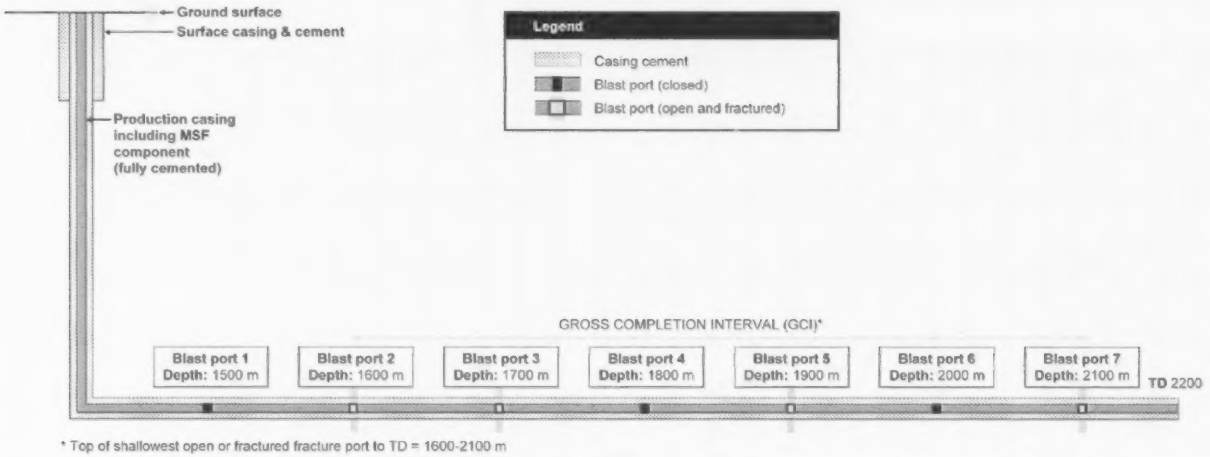

Ground surface
Surface casing & cement
Production casing including MSF component (partially cemented)
Legend
Casing cement
Liner
External casing packer
Fracture port (closed)
Fracture port (open but not fractured)
Fracture port (open and fractured)
Fracture port (now closed but previously open and fractured)
Uncemented hole
Open hole
Cement base 1400 m
GROSS COMPLETION INTERVAL (GCI)*
Fracture port 1 Depth: 1500 m
Fracture port 2 Depth: 1600 m
Fracture port 3 Depth: 1700 m
Fracture port 4 Depth: 1800 m
Fracture port 5 Depth: 1900 m
Fracture port 6 Depth: 2000 m
Fracture port 7 Depth: 2100 m
TD 2200
* Top of shallowest open or fractured fracture port to TD = 1500-2200 m
Liner shoe 2150

	Code	Interval (mKB) Top	Base
Initial completion (existing data)			
Drilling			
Production casing	4	-	2150[a]
Production casing cement	*	0	1400
Production casing cement	92	1400	2150
Completion			
Open hole	8	2150	2200
Fracture port 2	42	1600	1600.1
Fracture port 3	42	1700	1700.1
Fracture port 5	42	1900	1900.1
Fracture port 6	42	2000	2000.1
Fracture port 7	42	2100	2100.1
Subsequent completions (new submission)			
Fracture port 1[b]	42	1500	1500.1
MSF-port closed[c]	43	1600	1600.1
MSF-port closed[d]	43	2000	2000.1

* If casing is cemented, use the appropriate code from *Directive 059*. See requirement 8 (Cementing).
[a] Shoe of liner.
[b] Previously closed, this port has been reopened but is not fractured.
[c] Previously open and fractured, fracture port 2 has been closed.
[d] Previously open and fractured, fracture port 6 has now been closed.

3) Production casing run to surface is fully cemented and includes blast ports to facilitate fracturing

a) Initial completion


Ground surface
Surface casing & cement
Production casing including MSF component (fully cemented)
Legend
Casing cement
Blast port (closed)
Blast port (open and fractured)
GROSS COMPLETION INTERVAL (GCI)*
Blast port 1 Depth: 1500 m
Blast port 2 Depth: 1600 m
Blast port 3 Depth: 1700 m
Blast port 4 Depth: 1800 m
Blast port 5 Depth: 1900 m
Blast port 6 Depth: 2000 m
Blast port 7 Depth: 2100 m
TD 2200

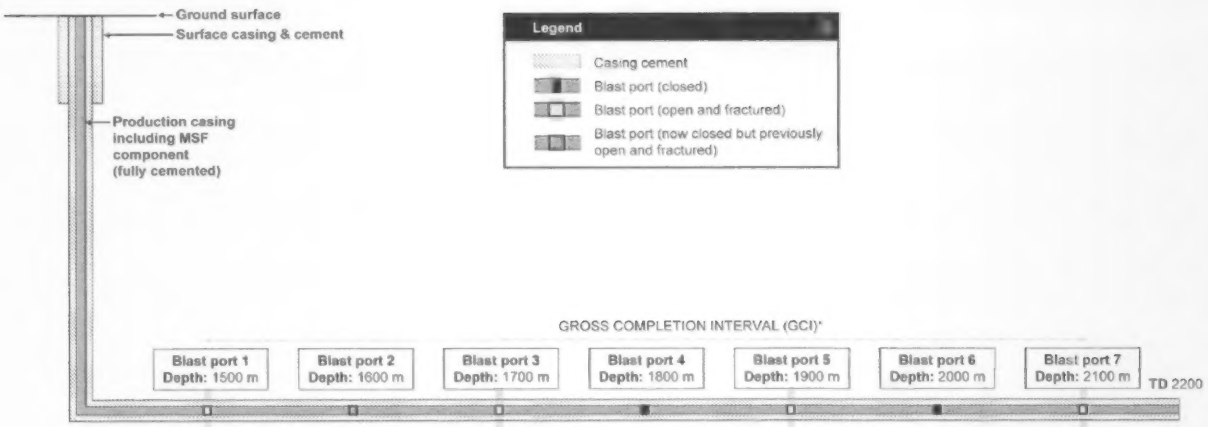
* Top of shallowest open or fractured fracture port to TD = 1600-2100 m

Initial completion (new submission)	Code	Interval (mKB)[a] Top	Base
Drilling			
Production casing	4		2200
Production casing cement	*	0	2200
Completion			
Open hole	8		None
Blast port 2	42	1600	1600.1
Blast port 3	42	1700	1700.1
Blast port 5	42	1900	1900.1
Blast port 7	42	2100	2100.1

* If casing is cemented, use the appropriate code from *Directive 059*. See requirement 8 (Cementing).

[a] If an open port incorporates multiple blast ports assembled adjacently, the interval top must be the top of the first port and the interval base, the base of the last port.

b) Subsequent completions


Ground surface
Surface casing & cement
Production casing including MSF component (fully cemented)
Legend
Casing cement
Blast port (closed)
Blast port (open and fractured)
Blast port (now closed but previously open and fractured)
GROSS COMPLETION INTERVAL (GCI)*
Blast port 1 Depth: 1500 m
Blast port 2 Depth: 1600 m
Blast port 3 Depth: 1700 m
Blast port 4 Depth: 1800 m
Blast port 5 Depth: 1900 m
Blast port 6 Depth: 2000 m
Blast port 7 Depth: 2100 m
TD 2200

* Top of shallowest open or fractured fracture port to TD = 1500-2100 m

	Code	Interval (mKB)[a] Top	Base
Initial completion (existing data)			
Drilling			
Production casing	4	-	2200
Production casing cement	*	0	2200
Completion			
Open hole	8		None
Blast port 2	42	1600	1600.1
Blast port 3	42	1700	1700.1
Blast port 5	42	1900	1900.1
Blast port 7	42	2100	2100.1
Subsequent completions (new submission)			
Blast port 1[b]	42	1500	1500.1
MSF-port closed[c]	43	1600	1600.1

* If casing is cemented, use the appropriate code from *Directive 059*. See requirement 8 (Cementing).

[a] If an open port incorporates multiple blast ports assembled adjacently, the interval top must be the top of the first port and the interval base, the base of the last port.

[b] Previously closed, this port has been opened and fractured.

[c] Previously open and fractured, blast port 2 has been closed.

Appendix 5 Electronic Well Drilling and Completion Data Submission Matrix

Key	
Mandatory	x
Possibly required (depending on submission)	P
Optional	o
Not required	-

Requirement number		Operation			
		Presetting	Drilling	Deepening	Completion
1)	**Account details**				
	a) Contact name	x	x	x	x
	b) Contact phone/fax/e-mail	x	x	x	x
	c) Acknowledge submissions by e-mail	x	x	x	x
2)	**Licence operation**				
	a) Licence number	x	x	x	x
	b) Operation start date	x	x	x	x
	c) Operation end date	x	x	x	x
	d) Submitter reference	o	o	o	o
3)	**Well operation (check box)**				
	a) Presetting surface casing	x	-	-	-
	b) Drilling operation	-	x	-	-
	c) Deepening operation	-	-	x	-
	d) Completion operation	-	-	-	x
	e) Surface abandonment operation	-	-	-	-
4)	**Presetting surface casing**				
	a) Spud date	x	-	-	-
	b) Casing	x	-	-	-
	c) Cementing	x	-	-	-
	d) Initial status code	x	-	-	-
5)	**Drilling**				
	a) Drilling contractor code	-	x	-	-
	b) Rig number	-	x	-	-
	c) Spud date	x	x	-	-
	d) Finished drilling date	-	x	x	-
	e) Rig release date	-	x	-	-
	f) Kelly bushing elevation	-	x	-	-
	g) Total depth	-	x	x	-
	h) Initial status code	x	x	-	-
6)	**Deepening**				
	a) Finished drilling date	-	-	x	-
	b) Total depth	-	-	x	-
7)	**Casing**				
	a) Casing date	x	x	-	-
	b) Casing code	x	x	-	-
	c) Casing liner outside diameter	x	x	-	-
	d) Casing grade steel process	x	x	-	-
	e) Casing grade yield strength	x	x	-	-
	f) Casing density	x	x	-	-
	g) Shoe set depth	x	x	-	-
	h) Liner top depth	-	P	-	-

Requirement number		Operation			
		Presetting	Drilling	Deepening	Completion
8)	**Cementing**				
	a) Cement code	x	x	-	-
	b) Cement amount	x	x	-	-
	c) Cement unit code	x	x	-	-
	d) Interval top	x	x	-	-
	e) Interval base	x	x	-	-
9)	**Core**				
	a) Core number	P	P	-	-
	b) Sidewall	P	P	-	-
	c) Interval top	P	P	-	-
	d) Interval base	P	P	-	-
10)	**Drillstem test**				
	a) Test number	-	P	-	-
	b) Test type code	-	P	-	-
	c) Interval top	-	P	-	-
	d) Interval base	-	P	-	-
11)	**Directional drill event**				
	a) Directional drill event date	-	P	-	-
	b) Directional drill event depth	-	P	-	-
	c) Directional drill event reason code	-	P	-	-
12)	**Plug back**				
	a) Plug back date	-	P	-	P
	b) Plug back purpose code	-	P	-	P
	c) Interval top	-	P	-	P
	d) Interval base	-	P	-	P
	e) Cement amount	-	P	-	P
	f) Unit code	-	P	-	P
	g) Method code	-	P	-	P
	h) Log tag code	-	P	-	P
13)	**Operation incident**				
	a) Occurrence type code	x	x	x	x
	b) Operation in progress code	P	P	P	P
	c) Occurrence date	x	x	x	x
	d) Occurrence depth	P	P	P	P
	e) Occurrence mud density	P	P	P	P
	f) Controlled date	P	P	P	P
	g) Controlled depth	P	P	P	P
	h) Controlled mud density	P	P	P	P
	i) Lost circulation total fluid	P	P	P	P
14)	**Completion**				
	a) Completion date	-	-	-	x
	b) Operation type code	-	-	-	x
	c) Interval top	-	-	-	x
	d) Interval base	-	-	-	x
	e) Shots per metre	-	-	-	P
	f) Cement amount	-	-	-	P
	g) Cement unit code	-	-	-	P
	h) Abandonment code	-	-	-	P
	i) Log tag code	-	-	-	P

Requirement number		Operation			
		Presetting	Drilling	Deepening	Completion
15)	**Packer**				
	a) Packer date	-	-	-	P
	b) Packer operation	-	-	-	P
	c) Packer code	-	-	-	P
16)	**Surface Abandonment***				
	a) Well type	-	-	-	-
	b) Original surface abandonment date	-	-	-	-
	c) Surface abandonment method	-	-	-	-
	d) Oil sands area	-	-	-	-
	e) H_2S	-	-	-	-
	f) Routine abandonment	-	-	-	-
	g) Groundwater base	-	-	-	-
	h) Groundwater protection method	-	-	-	-
	i) Re-abandonment	-	-	-	-
17)	**Amendment Request**				
	a) Licence number	x	x	x	x
	b) Unique well identifier (UWI)	x	x	x	x
	c) Details	x	x	x	x

* Submitted in DDS system under Submissions/Licence Abandonment.